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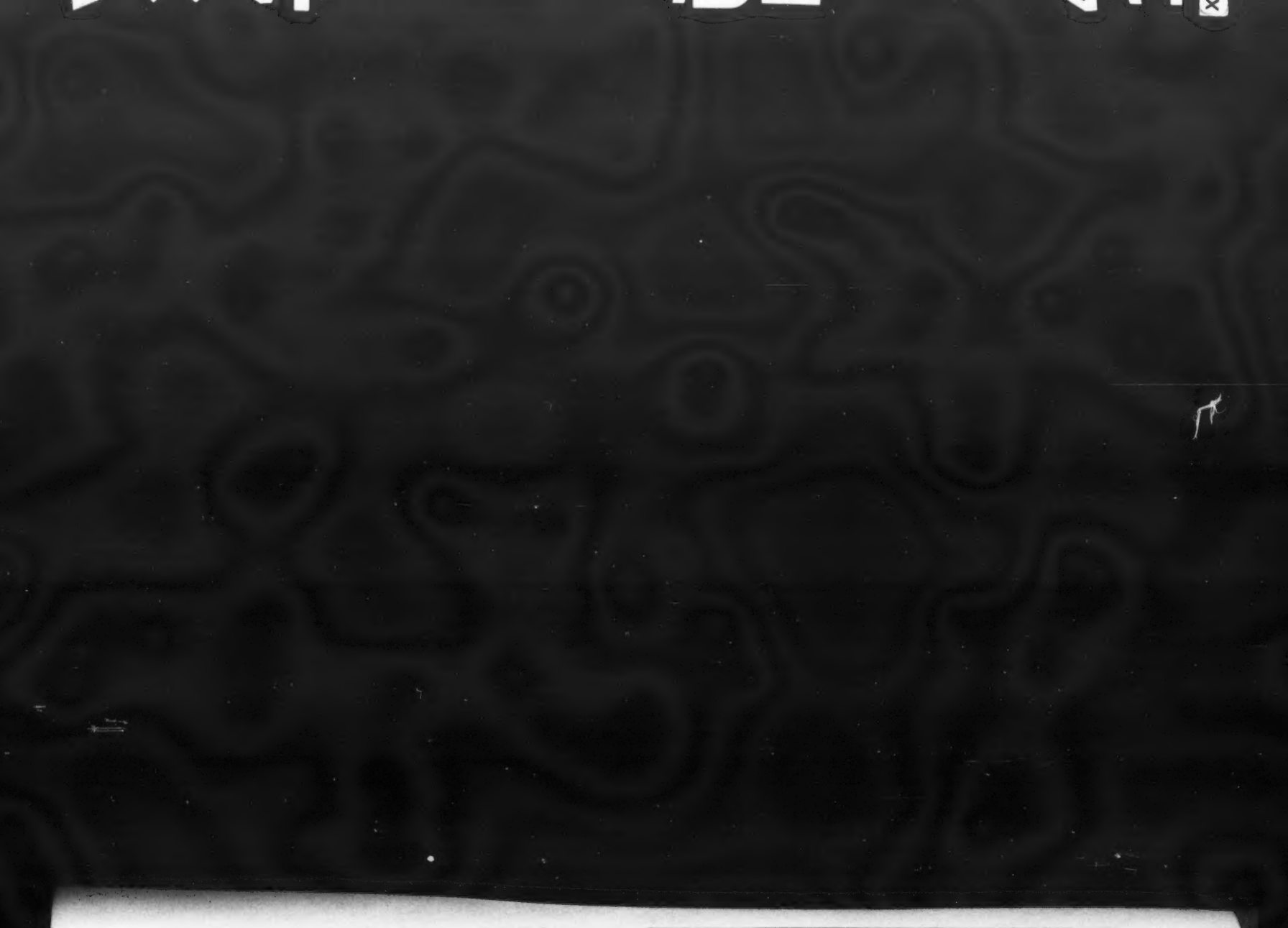

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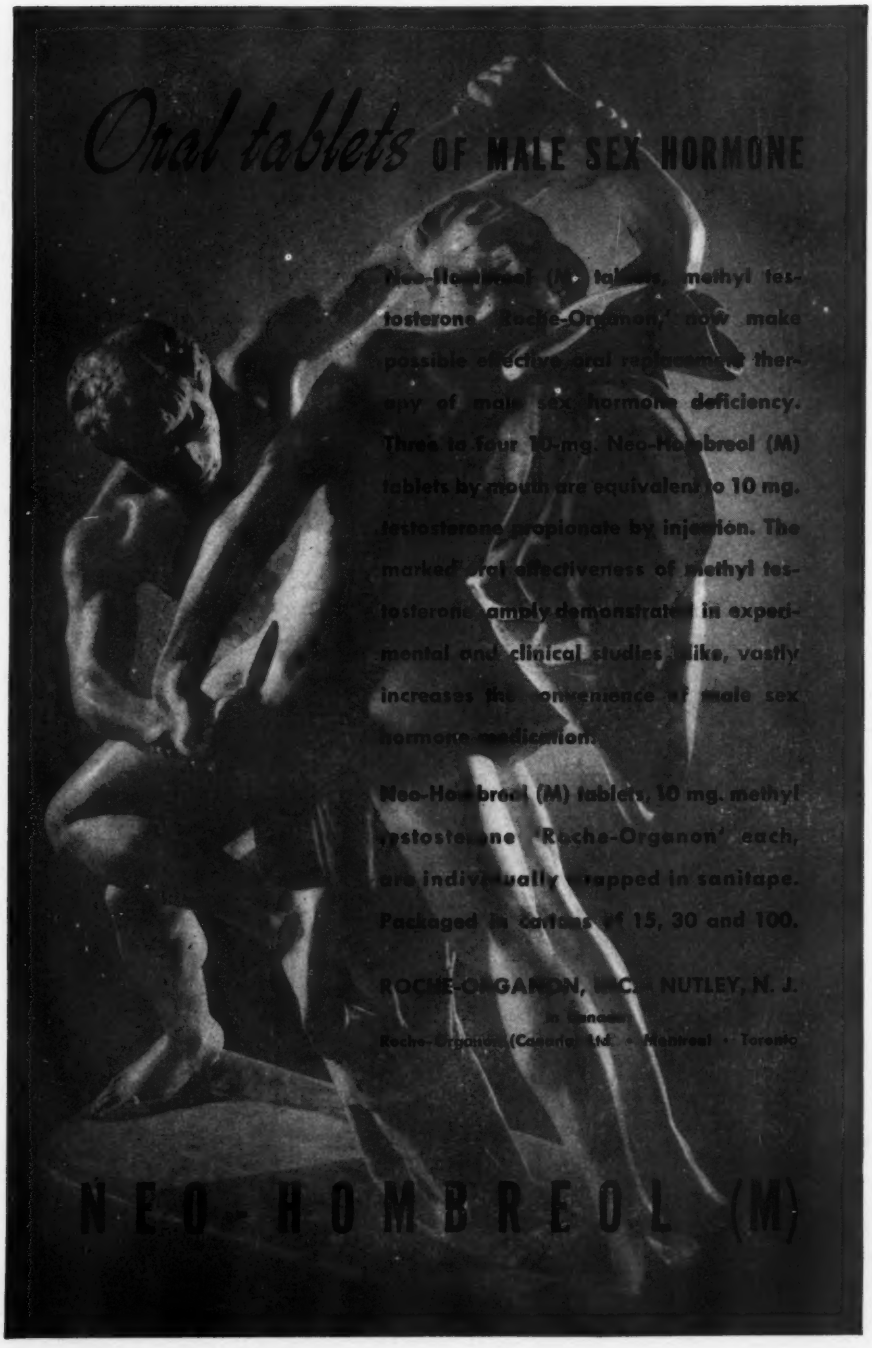
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2. Jr. A.M.A. 104-16-1377-1935.
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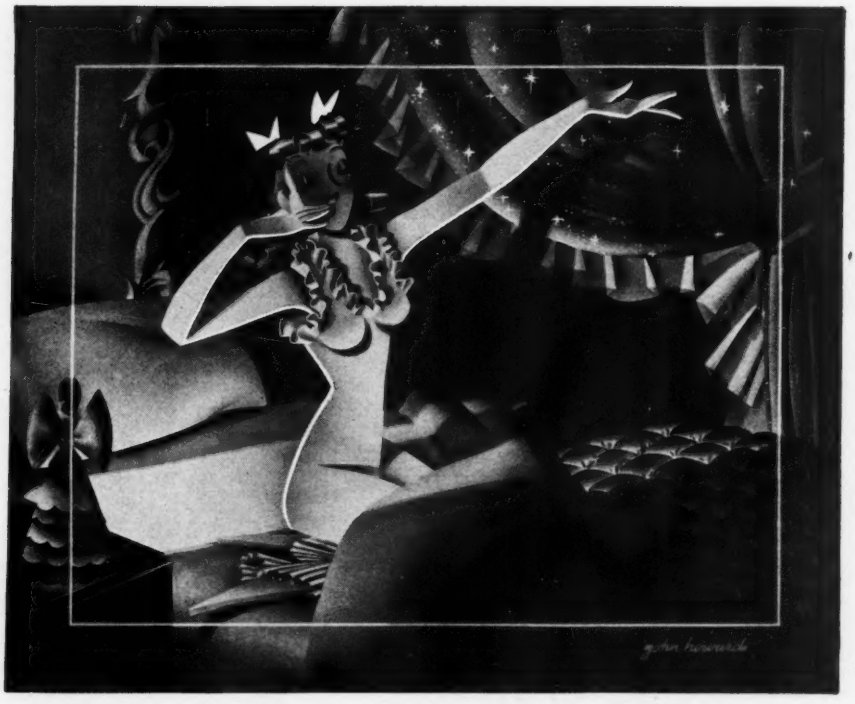

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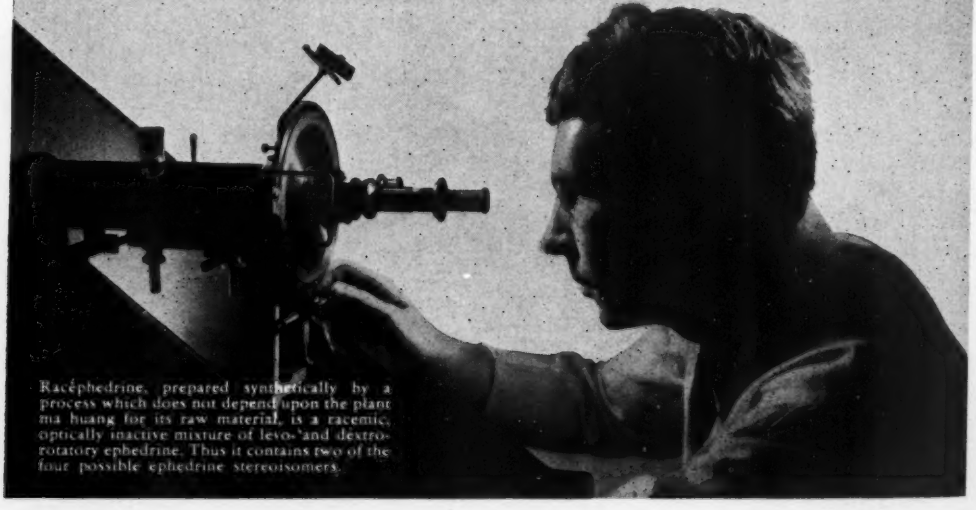

Racĕphedrine, prepared synthetically by a process which does not depend upon the plant ma huang for its raw material, is a racemic, optically inactive mixture of levo- and dextrorotatory ephedrine. Thus it contains two of the four possible ephedrine stereoisomers.

Clinically effective and entirely safe

When you prescribe Appella Apple Powder (Stearns) in the treatment of diarrhea, you are using a product which is safe, as well as clinically effective.

Appella Apple Powder (Stearns) is a food, and does not interfere with normal digestive or eliminatory processes—does not constipate or form concretions.

For infants, children and adults, the daily dose of an ounce or more is well tolerated and easily administered.

APPELLA APPLE POWDER
(STEARNS)

mixes well with water, milk or infants' formulas.

Supplied in 7-oz. cans for prescription use, and 1-lb. 4-oz. cans for hospital use.

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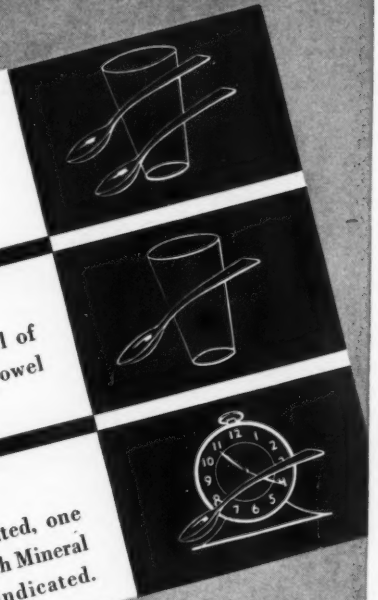
How to control Diarrhea with *Wyeth's* KAOMAGMA



At the onset... administer two tablespoonfuls of Kaomagma Plain, in a little water

and... follow this with one tablespoonful of Kaomagma Plain, after every bowel movement . . .

then... when stools become consolidated, one tablespoonful of Kaomagma with Mineral Oil 3 times daily may be indicated.

KAOMAGMA • Coats and protects the irritated mucosa, acting as a mild astringent. • Precipitates and coagulates bacterial suspensions. • Adsorbs and renders innocuous toxic and irritant substances in the intestines.

Kaomagma Plain and Kaomagma with Mineral Oil are supplied in 12-oz. bottles.

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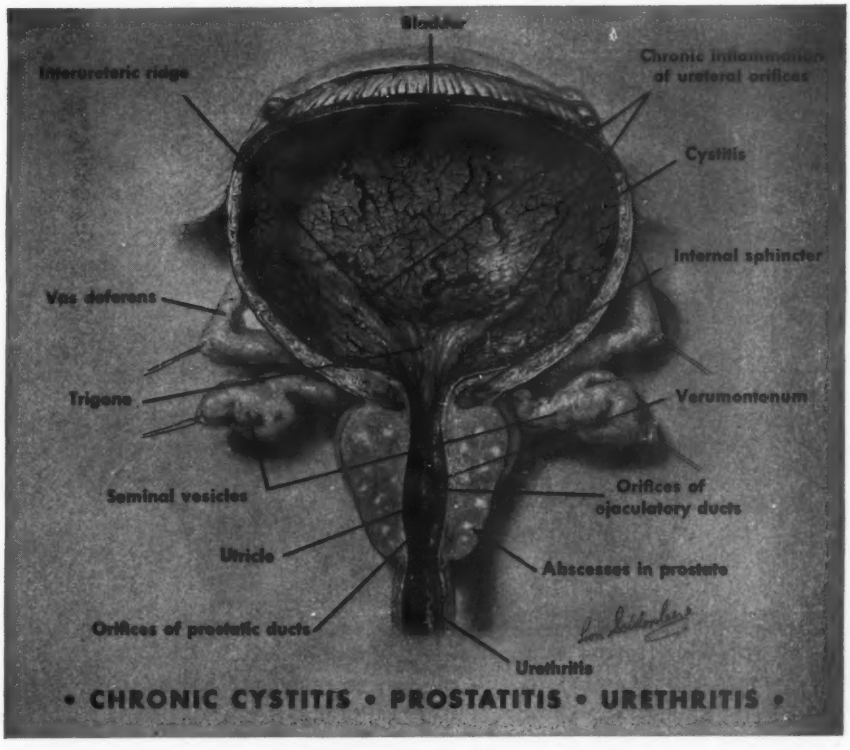
PYRIDIUM

(REG. U. S. PAT. OFF.)

(Phenylazo-alpha-alpha-diamino-pyridine mono-hydrochloride)

Its Status In Authoritative Published Literature



The following excerpt from a recently published article, again significantly demonstrates the value of Pyridium in the treatment of various uropathies:

Results	Pain	Burning	Dysuria	Frequency	Urgency	Hesitancy	Nocturia	Pyuria	Hematuria
Improved	32	98	28	54	10	17	41	42	7
No Change	15	18	10	38	5	3	35	12	
Increased				7	2		1	1	
TOTAL	47	116	38	99	17	20	77	55	7
Expressed in Per Cent									
Improved	68.2	84.5	74.0	54.5	59.0	85.0	53.0	76.5	100
No Change	31.8	15.5	26.0	38.4	29.3	15.0	45.5	21.8	
Increased				7.1	11.7		1.5	1.7	

(Reynolds, J. S., Wilkey, J. L., and Choy, J. K. L., Clinical application and results of pyridium therapy, *Illinois M. J.* 78:544-547, December 1940.)

ADVANTAGES OF PYRIDIUM

- *Eliminated through urinary tract*
- *Relatively nontoxic* • *Nonirritative*
- *Effective without urinary pH adjustment*
- *Well tolerated* • *Conveniently administered*

PYRIDIUM *is the United States Registered Trade-Mark of the product manufactured by Pyridium Corporation.*

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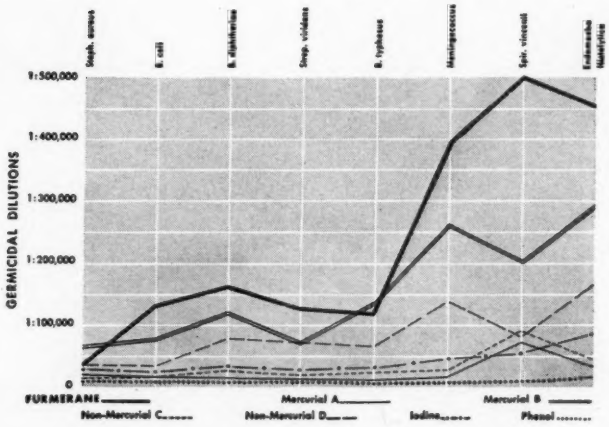

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Physicians are invited to write for full descriptive literature.

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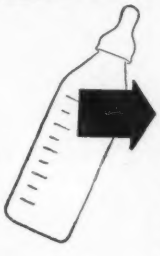

Pretty soft life! Nothing to do but eat, sleep and grow in comfort on S-M-A. It's a happy, healthy first year for the S-M-A fed infant because S-M-A promotes normal, comfortable growth.

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Normal infants relish S-M-A . . . digest it easily and thrive on it.

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It may be used the same as cows' whole milk, as a beverage, or in infant feeding formulae where a sensitivity to milk protein is known to exist.

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*S-M-A, a trade mark of S.M.A. Corporation, for its brand of food especially prepared for infant feeding—derived from tuberculin-tested cow's milk, the fat of which is replaced by animal and vegetable fats, including biologically tested cod liver oil; with the addition of milk sugar and potassium chloride; altogether forming an antirachitic food. When diluted according to directions, it is essentially similar to human milk in percentages of protein, fat, carbohydrate and ash, in chemical constants of the fat and physical properties.

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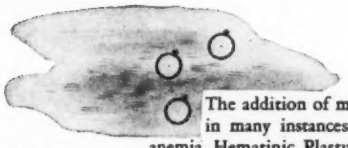

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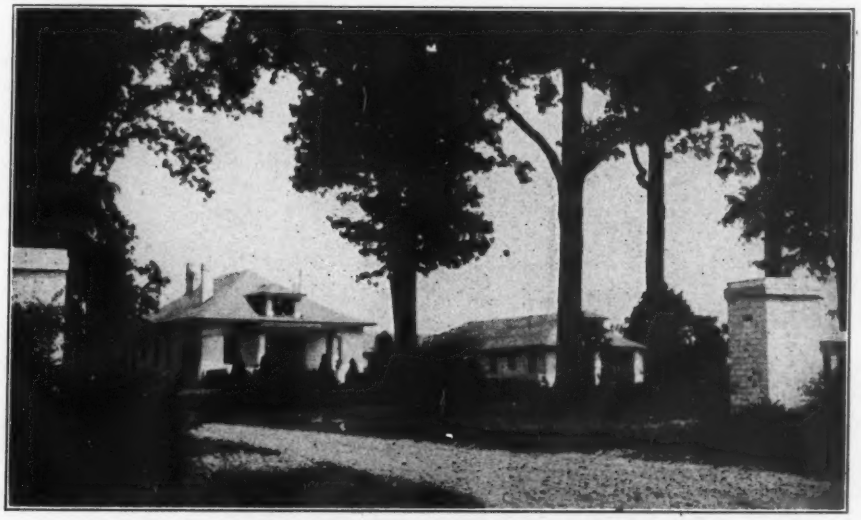

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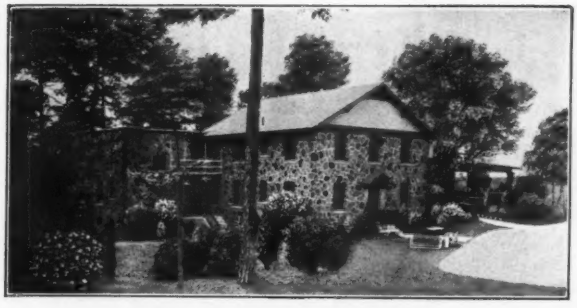

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The institution is situated just beyond the northern border of the city on United States Highway Number 1.

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There are twelve separate buildings for patients with 150 beds. Such a large group of buildings makes possible the more congenial grouping of patients. Rooms may be had single or en suite, with or without private bath. There are a few small cottages for the use of individual patients.

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Established in 1907

AN ENTIRELY NEW PLANT ERECTED IN 1922

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It is upon the character of service rendered, rather than upon physical facilities that the reputation of such an institution must rest, and to give every patient the maximum of individual attention and unremitting care at all times is the basic principle of our work. An efficient organization exists in all departments. There is maintained an abundantly sufficient staff of capable nurses, divided into day and night shifts, assuring to every patient constant service through each of the twenty-four hours of the day. At midnight this service is as real as at midday.

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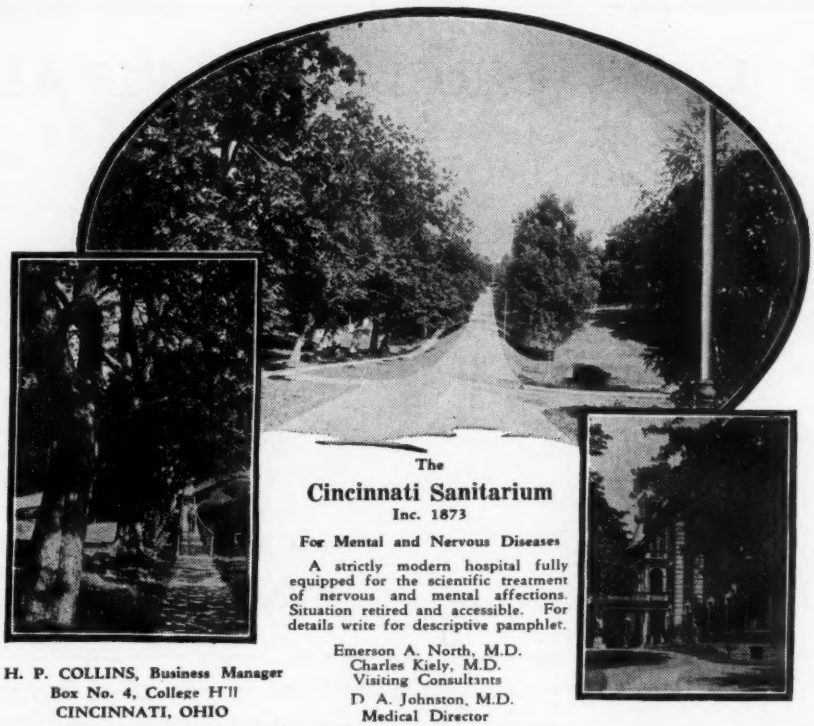

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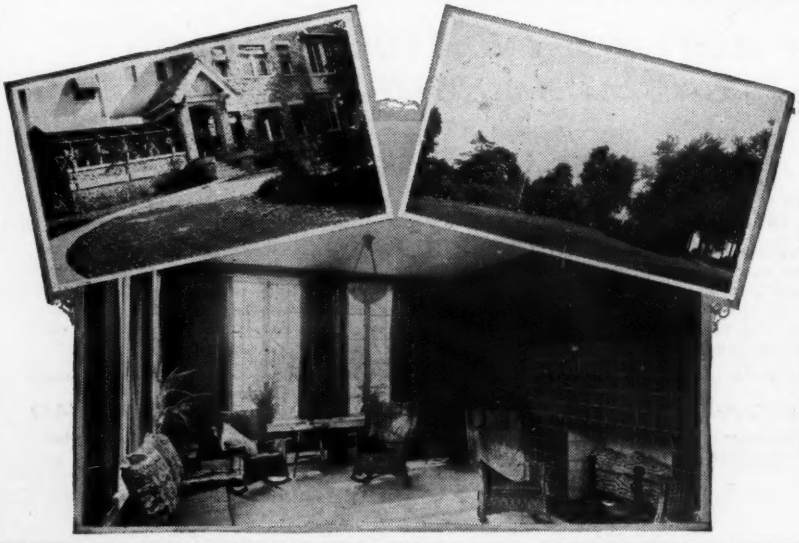

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SECRETION OF NAJA (COBRA)
IN STERILE PHYSIOLOGICAL SALINE SOLUTION
FOR INTRAMUSCULAR INJECTION
HYNSON, WESTCOTT & DUNNING, INC.

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The solution does not produce the objectionable reactions of morphine, is not habit-forming; the margin of safety is wider; patients do not develop tolerance. Dosage is usually reduced rather than increased after relief has been established. No serious untoward reactions or changes in the blood or vital organs have been reported, but the solution should be used under careful medical supervision.

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THE GREAT PHYSICIAN*

By ARTHUR T. MCCORMACK, M.D.
Louisville, Kentucky

Never in my life have I felt in a more natural position. This afternoon, while I had my eyes closed and was asking very reverentially and faithfully for an inspiration for the thoughts I was to express to you tonight in my Presidential Address, I could not have hoped to find myself more in the exact environment of my childhood, if I had sung "Backward, turn backward, O time, in thy flight; make me a child again just for tonight."

As a child, when I went to church, there was always the choir. They sang very much as I imagine the guests on my right, former presidents and officers of the Association, would sing. We had no musical instruments. The congregation was composed partly of saints and partly of sinners. The sinners always stayed near the back and stood up, unless they had their girls with them. I feel like the visiting clergyman, here, returning to the home of my fathers and standing in the old church down at New Haven.

Before I arrive at the subject of my talk, I want to say just a word or two of a personal nature. I want to express, first, my gratitude to this organization for its own character. I believe it is the nearest to the ideal of anything that I have ever known in scientific medical organization. The Council of the Association is the most impersonal and the most effective executive body I have yet seen. I had the privilege of attending the sessions last year and this, and I pinch-hit for Dr. Stucky once a great many years ago. The sincerity and frankness with which they discuss your affairs, the thoroughness with which they know what you are thinking about, and the interest they are taking in building up a purely friendly service organization of men with like interests, is one of the most delightful things I have had the opportunity of knowing. I want to express the gratitude which I feel, not only to those members of your Council with whom I have been permitted to associate but also to those who have preceded them in this organization.

In connection with the planning for this meeting, particularly with Drs. Henderson and Heflin, who shouldered the chief responsibility, although that has been shared by so many of the members of the profession in Louisville and Kentucky, that it would be impossible to name them all, I have had the opportunity of coming in frequent contact with Mr. C. P. Loranz, our Secretary and General Manager. He is efficiency personified. At the same time, he is so gentle and persuasive that he has made me know that everything he thought was right before I had an opportunity to do much thinking myself. And saved me a tremendous lot of work! I believe he is the most thoughtful, thorough and effective man I have ever known, and one of the most considerate and consecrated I have ever come in contact with.

It would be impossible for anybody to have occupied this position without having experienced the particular emphasis which all of you, with whom I have come in contact, have put upon the value of the JOURNAL of the Association. I know I am voicing your sentiments when I say to Dr. Dabney and Mrs. Dabney that the value of their services to each of us in our practice, and, through us, to our patients is absolutely incalculable, because they weed out from the tremendous amount of material that is constantly pouring over their desks those things which are of the most value to us, and I know how grateful you and I feel to them for that.

I want to express our appreciation, through Mrs. Corn as President of the Auxiliary, to that whole body for the very delightful way they carry

*President's Address, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

on the work which has been assigned to them. I do not think they do as well as they could do, but they look so lovely while doing it that we forget any defects they have. As soon as they have learned to appreciate their husbands and their husbands' work in that ideal way in which Dr. Crook would describe it, they will be able to paint pictures of us on the canvas of their imagination and exhibit them to the women's clubs, and the other organizations of which they are members, in such a way that the doctor will be exalted in this country to a degree never hitherto considered possible.

In 1874, a country doctor, a young fellow, was riding along on horseback after having gone some sixty miles on a trip to see twelve or fourteen cases of cholera and typhoid fever. As he rode back alone over a rough, muddy hill along the side of the Rolling Fork of Salt River down in Nelson County, tired from days and nights of that sort of service, he stopped under the shade of a tree and looked down toward the river. While communing with nature and nature's God, he, my father, had the vision that the time would come when man could be relieved of those types of disease which were caused by filthy environment.

In 1879, when the McDowell monument was erected, the greatest orator that medicine has ever given to this country, Dr. Samuel D. Gross, one of the founders of the Kentucky State Medical Association and a President of the American Medical Association, in his peroration closing the dedicatory address, urged in words that were ever afterward the inspiration of this young man.

"Young men of the Kentucky State Medical Society, listen to the voice of one who has grown old in his profession, and who will probably never address you again, as he utters a parting word of advice. The great question of the day is, not this operation or that, not ovariotomy or lithotomy, or a hip-joint amputation, which have reflected so much glory on Kentucky medicine, but it is preventive medicine, the hygiene of our persons, our dwellings, our streets; in a word, our surroundings, whatever and wherever they may be, whether in city, town, hamlet, or country, and the establishment of efficient town and state boards of health, through whose agency we shall be the better able to prevent the origin and fatal effects of what are known as the zymotic diseases, which carry so much woe and sorrow into our families and which often sweep, like a hurricane, over the earth, destroying millions of human lives in an incredibly short time. The day has arrived when the people must be roused to a deeper and more earnest sense of the people's welfare, and when suitable measures must be adopted for their protection as well as for the better development of their physical, moral and intellectual powers. This is the great problem of the day, the question which you, as representatives of the rising generation of physicians, should urge, in season and out of season, on the attention of your fellow-citizens; the question which, above all and beyond all others, should engage your serious thoughts and elicit your most earnest cooperation. When man shall be able to prevent disease and to reach with little or no suffering his three-score years and ten, so graphically described by the Psalmist, then, but not till then, will the world be a paradise, with God, Almighty, All-wise and All-merciful, in its midst, reflecting the glory of His majesty and power, and holding sweet converse in a thousand tongues with the human family."

For many long years, with this vision constantly with him, my father continued in an exacting general practice, first in the country, and, after going to Bowling Green, from the town into the country, going into everybody's home, working hard all day and coming back and utilizing the services of his family and of our servants in doing the work of the inspired though fragmentary organization that was developing medicine and public health in Kentucky.

He performed hundreds of major surgical operations in private homes, including the second cesarean section west of the Appalachians, hip-joint amputations, resection of portions of the colon, and end-to-end anastomoses, oophorectomies, appendectomies and delicate trephinings for the relief of pressure symptoms following old fractures. These intimate associations with people and with physicians made him aware of the needs and possibilities of medical organization. He helped to organize the Warren County Medical Society and to reorganize the Kentucky State Medical Association and to make of each a body of fine physicians and health officers in their respective jurisdictions.

He had organized the Conference of State and Provincial Health Authorities of North America in 1888 to prevent the admission of cholera into a nation not yet cognizant of its duty to protect the health of its people.

All of these rich experiences won for him national recognition and he was made chairman of the reorganization committee of the American Medical Association, where his labors carried him into every state in the nation and into all but a few of the counties of the whole United States. His addresses, each occupying one or more full pages, were published in more than a thousand newspapers in America.

This foundation work made possible the present organization of the American Medical Association, the most powerful, the most humane,

the most altruistic, scientific organization which serves mankind.

He told me once that what we know is only wonderful until we compare it with what we do not know. As you remember that, it will always give you the humility that befits a physician.

I want to report another clinical case.

In 1912, we had chartered a special train from Kentucky to Atlantic City to attend the American Medical Association. One of the physicians of the party was a country doctor from an almost nameless town in southern Kentucky. This man had never been outside of Kentucky since he graduated from the medical college in Nashville, but he had practiced for thirty-five or forty years. He never had a daybook or ledger, never made a charge and had never sent a bill. When he wanted any money—he never wanted much, but when he wanted anything—he stopped at any house that he was passing, the owner gave him a ham and some chickens or whatever he wanted, and the other things he needed he produced upon his own farm. But all of a sudden he was persuaded to collect some money from his patients. He collected $600 or $800 and decided to attend the American Medical Association.

At that time the American Medical Association elected four vice-presidents. General Gorgas was elected President that year. The First Vice-President was a very distinguished surgeon from Montana; the Second Vice-President, a great internist from Philadelphia; the Third Vice-President, one of the most distinguished contributions the South has made to medicine, from New Orleans. A number of men had been nominated for Fourth Vice-President, when a delegate who had met this man casually during the meeting got up and said he wanted to nominate a man different from all the distinguished names that had been called, a man that nobody knew, a man that probably only one member in the House of Delegates had ever heard of before. And yet, when he would describe him and his virtues, each one of them would think of the best physician he had ever known.

After dramatically describing the country doctor, he nominated Dr. E. N. Hall, of Woodburn, Kentucky. Dr. Hall was unanimously elected.

Dr. McChord and I walked out of the House and shortly afterwards met Dr. Hall on the Boardwalk. As we walked up to him, Dr. McChord said, "How do you do, Mr. Vice-President?"

"No," he said, "you aren't talkin about me. I am President of the Bank of Woodburn. I am no Vice-President."

"You were just elected Vice-President of the American Medical Association," Dr. McChord said.

I can still see the startled look in his eyes as he said: "If I was elected, my name ought not to be written on the roster. It ought to be written 'A Country Doctor from Somewhere in the United States.'"

I could multiply case reports like that by the hundreds from my book of rich memories about great physicians. But I realize I am talking to a group of great physicians in a day when everything seems to be shaken. What is an earthquake in Rumania when we ourselves are seeing the very foundations of the temples of civilization threatened?

As these thoughts crowded into my mind, I thought about the problems that are confronting you and confronting me. I have gone back a long way in my thinking and I have realized that the Grand Architect of the Universe developed it; He developed not only the beginning of everything that ever has been, but of everything that ever will be. All the science, all the knowledge that we have already acquired was there to be acquired when the universe was created. All the science, all the knowledge that will ever be acquired is here now. If we had enough faith, energy, vision, courage and sight, we could reach out, each of us, and do our part toward finding those things that are essential to the development of a perfect universe, and could know the desirability of using them for the benefit, not the destruction of mankind.

Now and then a star falls. Every now and then a meteor shines through the sky. Every now and then there is an explosion of a world. It is not a finished job. Sometimes I guess every one of us has wondered why we were created by the Master of the universe. When we stop to think of it we realize that the smallest thing we know about, that the smallest thing we have yet conceived in our science, is not nearly so small as each of us is when compared with the universe. Yet, see how wonderfully our physical beings are constructed, how marvelously they are built as mechanical housing for our minds and our souls. They are given us to be used temporarily. And we are to care for them. As attending physicians, we are to care for the physical well-being of others. That is our job.

We men of medicine are the mechanics who take care of the machinery of human life.

But is that all we are to do? Dr. Casparis developed this morning the necessity for our study of behavior. And is that all we are to do? Are we great physicians when we have stopped with the care of the body and of the mind? Is there not a trinity in the life we lead? And, is not our example the Great Physician, who cured while He walked among men and served them, cured not merely their physical ailments, but cured their minds and restored their souls as well?

Even so you do, day by day. I believe, my friends, and I want to share with you this faith, that the Great Physician, who in His case reports, or those written by his disciples, reports covered quite as fully as those of His contemporary physicians, laid the basis for our work. If we are to succeed in building a Christian civilization which will make life in this world continuous, and make us eligible for life in the world to come, we must build it on the precepts He taught. We must recognize and acknowledge Him, not only as the Grand Master of the Universe, but also as the Great Physician of our calling.

I merely want to take the time tonight, in a period when the whole world seems awry, to say to you as the best educated, the best selected, the pick of the whole human race, that you who have gone through the hardest mental tests, that you who have the greatest moral trials, contribute not merely to the physical rehabiliation of the body, but also you contribute to the spiritual rehabilitation of a patient every time you smile at him, every time you express to him your confidence not only in humanity, but in the God of humanity. You express to your patient the whole value of eternal life. I believe that we are destined, as the chosen people of God Himself, to redeem His world for Him and to redeem humanity for Him, to bring back to a beleaguered world peace and harmony, cure and rest. We can do it, as we go about our ways, in our offices, in the sanctuary of our hospitals, in the buildings which we occupy if we hold public position, provided we consider each place where we minister as a temple consecrated to the Great Physician and be conscious of having Him present with us always, knowing that we can always consult with Him and feel that He is there. Then we, ourselves, can serve Him and, in serving Him, best serve humanity.

RHEUMATIC HEART DISEASE*

POSTMORTEM STUDIES

By T. STERLING CLAIBORNE, M.D.

and

BERNARD P. WOLFF, M.D.

Atlanta, Georgia

Before any of us had begun the practice of medicine it had been observed that rheumatic fever is more common in cold, damp climates;[1] it occurs more frequently in New England than in the South.[2 3 4] This fact has been brought up so often that the Southern physician has grown to consider this disease too rare to be considered seriously. For this reason, we believe rheumatic fever has often gone unrecognized in the South.

If it is true that rheumatic fever may not be diagnosed in the South, it may also be true that other conditions are mistaken for it in the North. Clinical reports on the incidence of the disease therefore we have elected to disregard. Rheumatic fever is important in that it often results in serious damage to the heart. Mitral stenosis is almost invariably the result of rheumatic infection. This damage can be definitely diagnosed postmortem. Postmortem statistics therefore are irrefutable. These statistics show marked variations in different parts of the country. There was, for example, a report of 4.6 per cent mitral stenosis in routine autopsies at Peter Bent Brigham Hospital in Boston, in contrast to 0.23 per cent at Charity Hospital in New Orleans. No case of mitral stenosis was observed in 383 consecutive cases in an Oklahoma hospital. Longcope[7] reported 1.6 per cent rheumatic heart disease found at autopsy examination in Baltimore, and Weiss and Davis 9.1 per cent at Boston City Hospital. Glazer[8] has been quoted as finding an incidence of 3 per cent of rheumatic heart disease at postmortem examination in Cincinnati, but his figures should not be compared to others reported because they show the per cent of rheumatic heart disease among all cases of heart disease causing death, and not of total autopsy examinations.

The authors, graduates of southern medical schools, both of whom spent several years in

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*Read in Section on Medicine, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

*From Emory University School of Medicine.

Table 1

RHEUMATIC HEART DISEASE IN ATLANTA

No.	Year	Age	Sex	Race	Past History	Cause of Death	Pathologic Findings	Weight of Heart
1	1936	46	F	C		Pneumonia	MS	430
2		20	M	C	Recurrent sore throat	CF	A ver. endo. Ruptured cusp.	630
3		—	F	C		Gonorrheal endocarditis	MS veg. endo.	—
4		22	F	C		CF	MS	350
5		5	F	W		Meningitis	M ver. endo.	60
6		38	M	C	RF 16 years before	CF	MS and AS with calcification	1070
7		55	F	W		Postop. peritonitis	M ver. endo.	Large
8		55	M	W		CF	M ver. endo. peri.	Large
9		20	F	W		CF	MS	Large
10		15	M	C	RF 6 mos. before	CF	M and A endo., Aschoff	Large
11		40	F	C		CF	MS	600
12		14	F	C	RF 4 years before	CF	MS, Aschoff	750
13		5	M	W	RF 6 mos. till death	CF	Pan. MS early Peri. Aschoff	285
14		18	M	C		SBE	Old M and A, endo. A veg. endo.	495
15		26	M	W		SBE, CF	Old M and A endo. M veg. endo.	370
16	1937	33	F	C	RF in childhood	SBE, CF	Old M and A endo. M, A veg. endo.	350
17		30	F	C	RF 2 years before	CF, pneumonia	MS, Aschoff	280
18		54	M	W		Pneumonia	MS, AS with calcification	740
19		25	F	C	RF 3 times in 10 years	CF, pneumonia	MS, AS, TS, Aschoff	620
20		38	M	W		CF	MS, acute peri.	605
21		67	M	W		Aplastic anemia	MS, M and A calcification	Large
22		14	F	C	Chorea 6 years before	CF	MS, Pan. Peri. Aschoff	405
23		30	F	C	RF 12 years before	CF	MS, AS, TS	400
24		54	M	C		SBE	T veg. endo. M ver. endo.	400
25		49	F	C		CF	AS and AR	425
26		21	F	C		SBE	MS, veg. endo. A ver. endo.	385
27		50	M	W		CF	M ver. endo. Hypertensive heart	650
28	1938	52	M	W		SBE, CF	MS and veg. endo.	620
29		18	F	C		CF	Pan. Peri, M, A, T, endo. Aschoff	450
30		13	F	C		Burned, pneumonia	M and T endo. Aschoff	450
31		26	M	W	RF 12 years before	CF	MS, TS, A endo. Peri.	800
32		50	M	W		CF, SBE	MS, SBE	350
33		33	F	C		CF	Peri. Pan. Aschoff	350
34		39	F	C		Pneumonia	MS	260
35		12	F	C	RF 6 mos. till death	CF	MS, Pan. Aschoff	750
36		6	F	C		Pneumonia	Pan. M endo. Aschoff	160
37		45	F	C		Meningitis	M ver. endo.	250
38		27	M	C	RF 5 years before	CF	MS, AS, TS	425
39		45	F	C	Sore throats	CF	MS, TS, Aschoff	490
40		18	F	C	Sore throats	SBE	MS, veg. endo.	185

Table 1 (Concluded)

RHEUMATIC HEART DISEASE IN ATLANTA

No.	Year	Age	Sex	Race	Past History	Cause of Death	Pathologic Findings	Weight of Heart
41		15	M	C	Sore throats	CF	Pan. M, A, T, endo. Aschoff	465
42	1939	30	M	C		CF	Peri. Myocarditis	475
43		19	M	W	RF 13 years recurrent	CF	Pan. M, A, T, endo. AR, Peri. Aschoff	650
44		45	F	W		CF	MS, AS	270
45		13	M	C		CF	MS, A endo. Aschoff	515
46		5	M	C		CF	MS, T endo. Aschoff	—
47		56	M	W		CF	M ver. endo. Hypertensive heart	690
48		12	M	C		CF, SBE	MS, veg. endo.	470
49		43	F	W		SBE	MS, veg. endo.	275
50		24	F	C		CF, poison	MS, AS	260
51		30	F	C		Peritonitis	MS	245
52		5	F	C		CF	Pan. M, T, endo. Aschoff	180
53		37	F	C	RF 10 years before	CF	MS, TS	525
54	1940	14	F	W	RF 12 years recurrent	Veg. endo. staphy.	MS, AS, veg. endo. Aschoff	220
55		60	M	W		CF	MS	680
56		57	F	W	RF 22 years before	CF	MS with calcification	—
57		9	F	C	RF 2 years recurrent	CF	Pan. M, T, A, endo.Aschoff	550
58		40	M	W	Murmur 18 years	Dissecting aneurysm	AS with calcification	650
59		20	F	C	RF at death	CF, toxemia of preg.	MS	540
60		15	M	C	RF 2 years before	CF	Pan. AR, M endo. Aschoff	735
61		21	F	W		CF	Pan. M endo. Aschoff	465

MS—mitral stenosis
AS—aortic stenosis
TS—tricuspid stenosis
AR—aortic regurgitation
Endo—endocarditis
Peri—pericarditis
Pan—pancarditis
Ver—verrucous
Veg—vegetative
SBE—subacute bacterial endocarditis
CF—congestive heart failure
RF—rheumatic fever

northeastern hospitals, were struck with the frequent appearance of rheumatic heart disease among patients in Grady Hospital, Atlanta. Because of the prevailing opinion of physicians throughout the country that rheumatic heart disease is rare in the South, and because no exact statistics were available this study was undertaken.

METHOD

A review was made of every autopsy protocol at Grady Hospital from January 1, 1936, to July 1, 1940. During these four and one-half years, excluding those done on stillborn infants, 1,754 autopsies were performed. Both gross and microscopic findings were reviewed in the selection of cases.

In the cases selected as rheumatic heart disease one or more of the following lesions were present: pancarditis with the presence of Aschoff bodies, verrucous endocarditis; mitral, aortic or tricuspid stenosis and insufficiency. Pericarditis alone was not considered sufficient evidence for diagnosis and was an element of pancarditis in our cases. Usually more than one of these lesions was present.

Because of the frequency of syphilitic heart disease in this locality particular care was used in differentiating lesions of the aortic valve, and where doubt was present, the case was discarded. Although in our series 20 per cent had a positive Kahn reaction, this is not at variance with findings in general admissions to Grady Hospital, where 27 per cent of negro admissions have a positive Kahn. All of our patients with a positive Kahn were negroes.

In ten cases of subacute bacterial endocarditis, there were evidences of previous rheumatic heart disease at autopsy, but eight cases of subacute bacterial endocarditis were discarded because of indefinite evidence of underlying rheumatic heart disease. There were five cases of calcification of the heart valves considered

the result of rheumatic infection. In three of these, there was calcification of both the aortic and mitral valve. In two of the five cases, there was a history of rheumatic fever, and in the others the evidence of rheumatic heart disease was convincing.

RESULTS

In the 1,754 cases reviewed there were 62 cases of rheumatic heart disease (3.5 per cent). Active infection with Aschoff bodies in the myocardium was present in 22 cases. Of these 22 cases, 16 were under the age of 20 years and the oldest was 45. Forty cases were classed as old rheumatic heart disease (inactive rheumatic fever).

Age and Sex.—The youngest was 5, the oldest 67, the average age 30. There were 26 males and 36 females. This age and sex incidence is similar to that found throughout the country in rheumatic heart disease (*Table 2*).

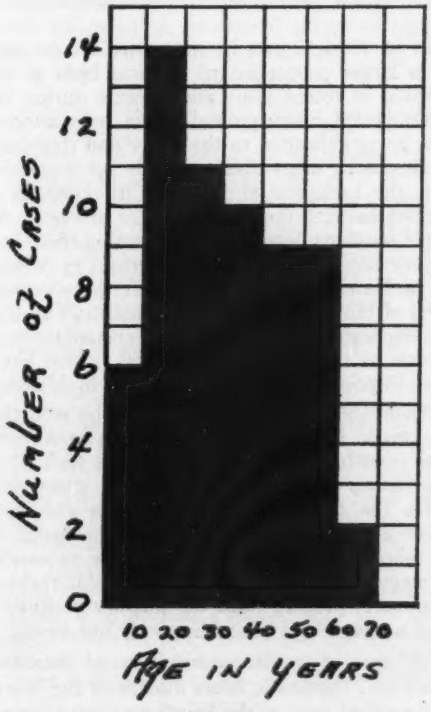

Table 2
Age at death in 62 cases of rheumatic heart disease.

Race and Nativity.—There were 22 white and 39 negro. This proportion is due largely to the higher incidence of autopsy examinations obtained on the negro in Grady Hospital. Fifty-eight of these persons were natives of Georgia. Two persons were born in South Carolina and one in Wisconsin. The nativity of one white man could not be determined. The factor of nativity is important in this type of study to determine the true incidence of disease. For example, Nichol had a large number of transients among his cases of rheumatic heart disease in Miami; in 401 autopsies there were 16 cases of rheumatic heart disease, but only two of the subjects were natives.

History.—In every case selected the clinical record was also reviewed. In 18 cases (29 per cent) a past history of rheumatic fever, that is, of swollen painful joints, was obtained from previous hospital admissions or from the history given by the patient on his final admission. There was one case of chorea (2 per cent) and there were 5 cases (8 per cent) with recurring attacks of acute tonsillitis.

Cause of Death.—In 48 (77 per cent) of the patients, congestive heart failure due to rheumatic heart disease was the cause of death. Rheumatic heart disease was a contributing cause of death in 10 cases (16 per cent) and incidental in 4 cases (6 per cent).

Mitral Disease.—The mitral valve was involved in 57 cases (92 per cent). Mitral stenosis was present in 36 cases (58 per cent) and mitral verrucous endocarditis in 21 cases (34 per cent). *Table 3* shows the occurrence of the anatomic lesions in the heart.

COMMENT

Previous studies on the incidence of rheumatic

Table 3

INCIDENCE OF LESIONS IN 62 CASES OF RHEUMATIC HEART DISEASE

Mitral stenosis	36
Aortic stenosis	11
Mitral verrucous endocarditis	21
Aortic verrucous endocarditis	12
Tricuspid stenosis	6
Tricuspid verrucous endocarditis	7
Pericarditis	10
Aschoff bodies	22
Vegetative endocarditis	
(a) streptococcus viridans	10
(b) gonorrheal	1
(c) staphylococcus	1

fever and rheumatic heart disease have in most instances been based on the clinical diagnosis and discrepancy in figures has resulted often in the same latitude.[5] [6] For example, there was a reported incidence of 0.48 per cent rheumatic fever in medical admissions at the University of Virginia Hospital in comparison to 0.15 per cent in Norfolk, Virginia.[4] In New York hospitals, the per cent varied from 2 to 6 per cent of medical admissions. A medical admission rate of from 2 to 5 per cent was found in Canadian hospitals. From 1918 to 1923 in Augusta, Georgia, there were 2,500 medical admissions, including only one case of rheumatic fever and one of chorea. These discrepancies may be partly explained by a difference in the economic level of the groups as well as a variation in diagnosis. Newsholme and authors since have remarked on the prevalence of the disease among people in the lower economic strata. Cecil[11] said that the incidence may be twenty times greater in this group than in the higher economic level. We believe that the relatively high incidence of rheumatic heart disease in our series can be explained in part by the low economic level of the group studied, and that this point is as important to consider as is the variation admittedly due to geographic location. In Grady Hospital are treated the charity patients, white and negro, from metropolitan Atlanta. It is a teaching hospital with general services, including medical, surgical, obstetrical and accident wards. There are no private beds and the economic level of the patient is uniformly low.

The climate in Atlanta is of a mild temperate zone. The mean temperature is 64.6°, the elevation is 1,050 feet, the latitude 33° 45′ north.

A comparison of the results obtained by our study with those that we obtained through personal communication is shown in *Table 4*.[11] [12] [13] [14] [15] The method by which these results were reached is important, since an accurate estimate of the incidence of rheumatic heart disease at postmortem examination cannot be determined from a file index. We feel that this must be obtained by a review of each autopsy protocol and this was done in preparing the statistics given from the Boston hospitals. Even with this accuracy, there is a wide difference in the per cent of rheumatic heart disease found at the Massachusetts General Hospital and at the Peter Bent Brigham Hospital, which we are unable to explain.

The higher percentage of rheumatic heart disease at Massachusetts General Hospital in 1923 than in 1936-40 can be accounted for in part by a larger proportion of surgical beds in the hospital in recent years and because during the latter period many patients have been referred to a hospital limited to the study and treatment of rheumatic heart disease. It is not surprising that the incidence at Boston City Hospital is highest because the patients there are from the lower economic level. It is interesting that there is four times as much mitral stenosis in Atlanta as in New Orleans even though the economic level of the patients in the two hospitals studied is comparable. The incidence of rheumatic heart disease at the University Hospital in San Francisco is practically the same as that in Atlanta.

Table 4

RHEUMATIC HEART DISEASE FOUND AT AUTOPSY EXAMINATION

Place	Years	No. Autopsies	Mitral Stenosis	Rheumatic Heart Disease	Per Cent Rheumatic Heart Disease
Peter Bent Brigham Boston	1936-40	976	—	82	8.4
Mass. General, Boston	1936-40	1627	—	63	3.9
University Hospital San Francisco	1935-40	833	—	28	3.4
Grady Hospital, Atlanta	1936-40	1754	2.0	62	3.5
Charity Hospital New Orleans	1936-40	6946	.52	—	—
Mass. General, Boston	1923	500	—	32	6.4
Boston City, Boston	1905-29	5215	—	474	9.1
Johns Hopkins Baltimore	1908-1929	8164 Adult medical only	—	146	1.6

From the statistics given, it can be seen that rheumatic heart disease is not rare in Atlanta. The occurrence of acute myocarditis with Aschoff bodies in 37 per cent of our cases indicates the frequency of fatal active rheumatic fever and does not suggest that rheumatic infection is mild in the South as far as cardiac damage is concerned. Nor is articular rheumatism rare, judging from the number of times it was noted in the past history of our cases.

Because of the larger incidence of rheumatic fever and rheumatic heart disease in the North, the medical men in the South may have learned wrongly to consider rheumatic fever infrequent and mild. We feel that the seriousness of this

disease should be impressed more strongly upon medical students and practitioners in the South so that they may be on the alert for its appearance whether in the form of articular rheumatism or rheumatic heart disease.

CONCLUSIONS

(1) Rheumatic fever and rheumatic heart disease are more frequent in the North than in the South. They are also more frequent among people in the lower economic level.

(2) The lower incidence of the disease in the South may have been over-emphasized, causing the opinion to develop that it is a rarity.

(3) An unexplained variation in the incidence of the disease in the same latitude has been noted.

(4) In Atlanta at Grady Hospital, rheumatic heart disease was found in 3.5 per cent of 1,754 autopsy examinations. There was a past history of articular rheumatism in 29 per cent of the cases of rheumatic heart disease.

(5) Rheumatic heart disease is not rare in the South and must be considered as one of our serious and fairly frequent diseases.

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DISCUSSION (*Abstract*)

Dr. Emmet F. Horine, Louisville, Ky.—I believe that the authors are quite correct in saying that Southern physicians have an idea that rheumatic heart disease is relatively infrequent. Their statistics, however, which show an incidence of 3.5 per cent certainly reveal the fact that rheumatic heart disease is not infrequent in the South and that we should be on the lookout for it. It is interesting that in Louisville our figures run approximately 4 per cent for rheumatic heart disease. As we go further north, the incidence increases, and, as Dr. Claiborne has shown you, it runs around 8 or 9 per cent in the New England states.

It is interesting to compare the possible economic level of those in New England to that of those included in this study in Atlanta. Conceivably, because of the large negro population, the economic level should be far lower than it is in Boston. Yet in Boston the incidence is certainly more than double that in Atlanta. If this be true, then there must be other factors in addition to the economic level which cause the increased amount of rheumatic heart disease in the New England States as compared to our Southern States.

With reference to the prevention of rheumatic heart disease, which Dr. Claiborne did not discuss, I think it is important at least to mention it. Certainly the removal of foci of infection is important; attention to diet and to open air exercise will be quite helpful. Further, the raising of the economic level would seem to have some bearing upon the situation.

I was very much interested in Dr. Claiborne's statement concerning the incidence of syphilis in the Grady Hospital. He found a Kahn positive percentage of 27, as I understood him. In our own City Hospital our syphilitic percentage runs around 25 for those cases. Of course it is higher for the negroes than for the whites in the City Hospital.

CESAREAN SECTION WITH SPECIAL REFERENCE TO LOWER SEGMENT OPERATIONS*

AN ANALYSIS OF 110 CONSECUTIVE CASES

By WAVERLY R. PAYNE, M.D., F.A.C.S.

and

HARVEY G. BLAND, M.D.

Newport News, Virginia

During the past ten years cesarean section has been subjected to very critical study by a large group of investigators. Every section of the country and many of the large clinics have been ably represented. Their observations and conclusions are a matter of record and need not be reviewed in this paper. To one like myself engaged in a strictly private practice such studies are invaluable. In studying the more recent reports one is impressed with the greater diversity

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in types of operations employed, and with the very definite decrease in morbidity and mortality incident to the lower segment operations. It also seems that where fewer operators were concerned the mortality rate was lower. It is with these thoughts in mind that this paper is presented.

Table 1

GENERAL DATA

	Number	Percentage
Total deliveries	1455	
Total cesarean sections	110	7.56
Primary cesareans	89	6.12
Repeat cesareans	21	1.44
Maternal mortality	0	0.0
Live births	113*	
Fetal mortality	1	0.88†

*Three sets twins. †Percentage of cesareans.

This study covers a ten-year period, from January 1, 1930, to October 1, 1940. During that time 1,455 women beyond the twenty-eighth week of gestation were delivered in one of three general hospitals, each of which furnishes a separate floor or pavillion and a separate nursing personnel for the care of obstetrical cases. With few exceptions these patients received adequate prenatal care. The group is made up entirely of private cases personally attended and includes complicated and uncomplicated cases referred by other physicians. Of this group, 110 were delivered by cesarean section, an incidence of 7.56 per cent, which is much higher than that recorded by some of the larger clinics. There were no maternal deaths following cesarean section. There were 114 babies born alive, including 3 sets of twins. There was one neonatal death. This infant was the second child of a 23-year-old nephritic mother, who had had a previous high classical cesarean by another operator. On this last occasion she reported for her first prenatal examination in the latter part of the eighth month. At that time her blood pressure was 190/110 and urine contained a large amount of albumin. Her condition grew worse on the usual conservative regime and delivery was deemed advisable. At 8½ months, under spinal anesthesia, a low classical cesarean was done. The baby was alive but poorly nourished, and died 18 hours after birth. This case teaches one other lesson, namely: the importance of repeated cesareans. The uterine scar was found to be ruptured and the membrane protruding. The mother made an uneventful surgical recovery.

Table 2

TYPE OF OPERATION

Type of Operation (110 Cases)	Number
Low transverse (Phaneuf)	70
Laparotrachelotomy (DeLee)	17
Low classical	18
Low classical (Schumann)	2
Low transverse and hysterectomy	2
Low classical and hysterectomy	1

As the table indicates, the lower segment operation was employed 89 times. During the major portion of my training in obstetrics and especially during my residency, on the service of Dr. S. A. Cosgrove, the lower segment operation featuring the transverse incision was rapidly gaining in popularity. To me it seemed a logical procedure. By that means even in cases without elongation of the lower uterine segment the incision could be confined to that area. The operation was frequently employed in potentially infected cases and often followed by a smooth convalescence. Upon re-entering practice I was naturally enthusiastic about the operation, and to date have a high regard for its possibilities. The reports of Phaneuf, Greenhill, Barrett and others have borne out the original idea. I have been impressed in repeated sections to find little evidence of the first scar. I am cognizant of the fact that this operation is not a competitor with the Latzko or Waters operation, yet in a private practice with patients under close supervision the occasion will rarely arise demanding one of the latter. In selecting this operation we have not been much concerned about whether or not a hospital vaginal examination had been done. It seems to me that there is little difference between a careful vaginal and a rectal in which the vaginal mucosa is pushed into the cervix. Rupture of the membranes up to 18 hours has not worried us.

Preference, therefore, has been shown the transverse incision, but in some cases presenting a deep pelvis, making the exposure difficult, the low longitudinal or laparotrachelotomy of DeLee has been done. The lower segment operations, having proven safer in potentially infected cases, have been the choice in many clean or elective cases.

In this series the high classical was not done, and the low classical only in elective cases with unruptured membranes or in placenta previa. Cesarean section was followed by hysterectomy upon 3 occasions: once in a potentially infected case with large nodular obstructing fibroids and ruptured membranes; once in a repeat section

for placenta previa in which bleeding could not be satisfactorily controlled and in whom sterilization was planned; and finally in a primipara whose cesarean was done after a long trial labor with disproportion. This latter case might readily provoke criticism from any obstetrician who was not present. The uterus was atonic and failed to improve with the use of ergotrate intravenously, posterior pituitary extract into the uterus, compression of the uterine vessels, and packing. Considerable time was consumed, but finally we felt that the patient's life should not be further jeopardized, and a hysterectomy was done.

Table 3

COMBINED OPERATIVE PROCEDURES

	Number
Cesarean section only	87
Cesarean plus ligation of tubes	19
Cesarean plus salpingo-oophorectomy	1
Cesarean plus hysterectomy	3

Combined operative procedures were necessary 23 times. Nineteen times it was for sterilization and several methods were used. Early in the series the removal of a wedge-shaped section, including the base of the tube, was done, and the distal end of the tube buried. Later we adopted the technic of Madlener. We do not consider sterilization an indication for cesarean section, since it is a simple procedure to do a Madlener operation under local anesthesia postpartum, preferably two days after delivery. One case presented a large ovarian cyst early in pregnancy. It was not removed because there were several episodes of vaginal bleeding, suggesting placenta previa. As the patient approached term the cyst became impacted in the pelvis, preventing engagement of the head. Hysterectomy was done upon 3 occasions as described.

Table 4

TYPES OF ANESTHESIA

Anesthesia	Number
Nitrous oxide-ether	60
Nitrous oxide	4
Ether	25
Ethylene-ether	6
Ethylene	2
Cyclopropane	2
Spinal (procaine)	7
Local	3
Local plus nitrous oxide	1

The matter of selecting proper anesthesia for cesarean section may be more of a problem than for a routine laparotomy. All complicating factors have to be carefully weighed. Pre-anesthetic preparation may often not be so complete as one might desire, yet should be the best that circumstances will permit.

With the variety of anesthetic agents at our command, a suitable one can always be selected.

With good preliminary sedation, we have used general anesthesia most frequently. You will note various combinations. Strangely enough, the only case of pneumonia in this series was one of two cases done under cyclopropane. This patient, a primigravida, had a partial placenta previa. We believe that spinal anesthesia, in dosage limited to 100 mg. of procaine hydrochloride, is a very useful agent in certain types of cases, especially the severe toxemias or patients with acute respiratory infections. We have found it almost indispensable in certain types of difficult vaginal delivery and with 50 mg. dosage have had no unfavorable results.

Table 5

INDICATIONS

Indication	Primipara	Multipara
Cephalo-pelvic disproportion	27	5
Contracted pelvis	10	2
Previous section		21
Toxemia	7	1
Placenta previa	5	2
Breech presentation	6	1
Previous stillbirths		7
Miscellaneous	13	4

In this study we have not attempted to differentiate absolute from relative indications. We are frank to state that many of these cases would fall into the latter group. We have often elected cesarean section not in competition with vaginal delivery, but as opposed to a prolonged labor with difficult vaginal delivery, which might result in morbidity to the child and disability to the mother. All of us have made postpartum examinations upon patients following vaginal delivery when all of the prerequisites from delivery had been fulfilled; yet the patient had far too much relaxation of her pelvic structures. Along this line, I was very much impressed in seeing and hearing Dr. Arthur H. Curtis' beautiful demonstration of pelvic anatomy, and at that time heard him make the statement, and I hope I quote him correctly:

"By no surgical means can the pelvic floor be fully restored to its normal condition following extensive obstetrical trauma."

I fully agree with him and believe that we should always consider that side of our problem as well as the obstetrical issue at hand. The first group is a common one and represents the largest single indication. There were 21 cases in which previous cesarean was the outstanding indication. Of the 21 cases, the previous cesarean had been done by us (13 times), and on 3 occasions there had been two previous cesareans, and on 1 occasion 3.

The dictum: "Once a cesarean always a cesarean" has been strictly adhered to. In my own experience the lesson has been forcibly impressed: in the first instance by the patient who was mentioned earlier in the paper, who presented a perforated scar at the time of operation; and by a second patient who came to me having had a previous high classical cesarean by one of my colleagues. When she was advised of the necessity of a second cesarean she promptly consulted another physician, who assured her that she could be safely delivered through the normal channel. She had a relatively normal labor, but ruptured her uterus and died 6 days later of general peritonitis.

You will note that toxemia has been listed as an indication in 8 cases. No case of convulsive toxemia was delivered by cesarean section. I am thankful to say that we have had only a few such cases, all of which were delivered vaginally. Cesarean section may well be employed in such cases after the convulsive seizures have been controlled, if an obstetrical indication demanded it. In this group the patients had been on conservative treatment until delivery was considered urgent and other conditions which would fulfill the requirements for a quick vaginal delivery were lacking. Our cases of placenta previa have been individualized. This group includes two central and five partial types. Breech presentation was the indication in six primipara and one multipara. In all of these the age of the patient, long periods of sterility, type of pelvis, size of baby, and so on, were considered. Under previous stillbirths there were seven cases, and likewise in these, other factors were taken into consideration.

This group for the most part speaks for itself. The 4 cases of pelvic deformity included 2 due to fracture of the pelvis and 2 due to disease. The case done by request was a 46-year-old primigravida who had been a long-standing sterility problem. She had worked in an institution for mentally defective children, where she learned that many were due to birth trauma. I thought she had a very plausible reason for her request.

Table 6

INDICATIONS—MISCELLANEOUS

Indication	Primipara	Multipara
Tumors	2	
Cervical dystocia	1	1
Pelvic deformity	4	
Recent repair		3
Shoulder presentation	2	
Previous myomectomy	2	
Face presentation	1	
Requested	1	

Table 7

MORBIDITY

	Number of Cases	Average Days in Hospital
Afebrile	69	12
Reaction temperature	22	12.5
Complications	19	17.5

100.4 on more than one day, exclusive of immediate postoperative reaction.

Our table of morbidity indicates that on the basis of excluding a single rise of 100.4 except on the day of operation, 69 were afebrile. In the group classed as recreational temperance, no clear-cut diagnosis was recorded. In most instances there was a slight rise in temperature on several occasions.

Table 8

COMPLICATIONS

Complications	Number of Cases
Pyelitis	6
Mastitis	1
Metritis	1
Bronchitis	1
Paralytic ileus (diabetes mellitus)	1
Secondary anemia	3
Phlebitis	2
Pneumonia	1
Wound infection	1
Pelvic infection (prior to operation)	1
Acute dilatation of stomach	1
Pulmonary infarct	1

In this series of cases we had a fairly representative group of complications. It is our feeling that many complications can be prevented by careful management of the patient during the prenatal period. I am thinking especially of the urinary system, because it is most frequently neglected. It has been our practice to culture the urine in every patient showing pus, even in the smallest amount, and to resort to

complete study of the urinary tract when indicated. The splendid work of Traut and his coworkers of New York is most timely and should be far-reaching in its effect. In our cases of pyelitis, with one exception, the patient had had previous attacks either during or prior to pregnancy. Since adopting a more complete plan of study in patients who have had pyuria during the present period, we have noticed a definite decrease in postpartum pyelitis, and this will naturally apply in sections. The red blood count should be carefully watched during pregnancy, and one should not be satisfied with less than a complete study of the hemoglobin, cell count, and stained smear. This may save one embarrassment during the postoperative course. Our patients are given adequate fluids and sedatives during labor. Following the operation they are given nothing by mouth except small amounts of water, the fluid balance being supplemented by intravenous administration of Ringer's solution. They are given hot tea, broth, and coca-cola on the third day. That is followed on the fourth day by cereal, toast and custard. The lower bowel gets little or no attention for the first five or six days. We frequently start mineral oil when the patient is on a regular diet and give 100 c. c. water and glycerine enema 5 or 6 days postoperatively. At the time of operation we do everything possible to avoid contact with the intestines. We always wash the stomach immediately after finishing the operation if the vomitus is abnormally heavy and discolored, and often leave a nasal tube in the stomach for 12 hours. This applies mostly to patients who have had long labors. By adhering rather strictly to this routine we have had practically no postoperative distention. In the two cases presenting thrombophlebitis, one occurred following a severe throat infection five weeks postoperatively. This patient re-entered the hospital because of a streptococcus infection, but having the rare complication of phlebitis following that disease we charged it to our service. The other patient developed thrombophlebitis 14 days postoperatively, after a relatively smooth convalescence.

CONCLUSION

This study represents an analysis of the author's entire series of 110 consecutive cesarean sections without maternal mortality, without a stillbirth, and with only one neonatal death. An attempt has been made from year to year to utilize the larger experience of others in applying it to our practice. All work was done in one of three general hospitals where reasonable precautions have been provided to safeguard the welfare of obstetrical patients.

DISCUSSION (*Abstract*)

Dr. W. Bush Anderson, Nashville, Tenn.—When I was requested to open the discussion on Dr. Payne's paper, I asked myself why he had chosen me, because I do not do cesareans nor any other abdominal surgery. But on second thought I was convinced that I am the proper one to discuss cesareans because, after all, the question of indications for and the prognosis of cesarean deliveries rest solely upon the judgment of the obstetrician. I will not discuss Dr. Payne's technic, but will leave that for those who do cesareans and other abdominal surgery.

Indications for cesarean sections are growing in frequency and justly so, since better technic is being observed. But there is yet something lacking in technic. Especially is this so in closing the uterine wound. One rarely sees a ruptured uterus nowadays except in a labor subsequent to a cesarean section. The old dictum, once a cesarean always a cesarean, is probably a wise one.

In Nashville, in the past ten years, there have been six or eight ruptured uteri in labors, subsequent to cesareans. These were in four different hospitals by as many different surgeons. About 4 per cent of women who go into labor subsequent to a previous cesarean delivery have ruptured uteri. I think I am correct in that statement and ruptured uteri from all other causes would be around 0.05 per cent. I have not heard of a rupture following the lower segment operation. But this type of cesarean section has only recently become popular so there may yet show up some unforeseen weakness.

I have delivered several babies, following a previous cesarean section, but it is always with fear and trembling. I will not mention a long list of indications. I will say that Dr. Payne is liberal in his indications, but with such unparalleled results one hardly feels justified to criticize. However, he is leaving many women so that it will not be safe for them to go into labor except in the presence of a surgeon. What would be an indication in one woman may not be in another.

In eclampsia, for instance, or threatened eclampsia, where adequate treatment has failed to check the toxemia and where conditions indicate a long hard labor a cesarean is indicated, yet I would not say toxemia per se is an indication for a section, nor would I say a breech presentation per se is an indication but with many indications may be added. There is a point that should be stressed, namely: that where a cesarean is done because of a permanent pathologic condition such as heart failure, chronic nephritis, tuberculosis or any condition made worse by repeated pregnancy or a low grade mentality, or for economic reasons, the opportunity to sterilize the patient should add to the indications for a cesarean. It has been truthfully said that a placenta previa centralis is always an indication for a cesarean. I have seen 2 cases of slight marginal placenta previa bleed so profusely that a cesarean was indicated to save a baby and mother. As to whether a high classical or a low cervical type, conditions may arise to make either preferable. In the elective class where danger of in-

fection is not a factor and where a short anesthetic is desired, probably a high classical cesarean would consume less time.

Dr. Edward L. Cornell, Chicago, Ill.—I favor the low cervical cesarean section in all types of cases except those in which you are planning to do a Porro cesarean. The mortality and morbidity rates are a great deal lower. I have seen too many tragic outcomes of the classic cesarean section even in the hands of the best of operative technicians.

The indications for cesarean section in placenta previa I think are absolute. There is possibly one exception, and that is in the multipara who comes in with almost complete dilatation and not bleeding very much.

The outcome of placenta previa handled from below is too uncertain. The amount of bleeding is never predictable.

The low cervical cesarean section patient can be given her food sooner. There is a great deal less distention, and the patient does not have to be starved.

One should learn the low cervical cesarean section and use it. Whether one uses the transverse incision in the lower uterine segment or the longitudinal incision, makes no difference. It is just the method with which one becomes familiar, that he should use. The only objection I have to the transverse incision is that many times the rupture or tearing of the wound extends out into the plexus of veins at the side of the uterus. In one case we had a very severe hemorrhage at that point.

Dr. Payne (closing).—In presenting this paper I realized quite well that the indications for operation were rather liberal. Of course, there are certain things involved in this study that I could not cover in the time allotted to me, for instance, the question of the type of patient. In this group there were only four colored patients. That, perhaps, has made some difference in the problem, when you consider type of pelvis, and so on.

Concerning the point that Dr. Anderson brought out about my liberality toward cesarean section in breech cases; I mentioned in my paper, and tried to emphasize the fact that the large majority of these women had some other problem than the breech itself. One case was delivered by Dr. Piper in Philadelphia. He said that he had a great deal of trouble delivering the patient of her first baby. She became insane six weeks following the delivery and was confined to an institution for six months. When she consulted me, she had a breech again, with a rather large baby, and assured me that she would break down mentally again if she did not get a live baby. I felt that I was duty-bound and obligated in a case of that kind to give her what I thought was the best chance for a live baby.

Several of these cases were long standing sterility problems. One of them had been sterile for twelve years. This woman had certainly a borderline type of pelvis, with a rather evident disproportion. We felt in that case it was not best to allow her to go on. So in practically all of these cases, with the exception of two, there was some other factor involved.

I want to thank Dr. Anderson very much for dealing with me as kindly as he did on that particular point.

I am glad Dr. Cornell discussed the technic of this operation. I have been rather partial to the transverse incision because I was trained to do that but have done the longitudinal lower segment operation a few times. In regard to the difficulty encountered in bleeding from the transverse incision, I have employed a bandage scissor directing the incision in a U-shape rather high, so that if a tear should occur, it would go a little above the danger point.

TREATMENT OF PRURITUS OF THE PERINEUM, LABIA AND VAGINA*

BY NEWER METHODS, INCLUDING INJECTION OF ALCOHOL AND THE USE OF STILBESTROL AND AN ASTRINGENT CRESOL DERIVATIVE

By LAWRENCE R. WHARTON, M.D.
Baltimore, Maryland

Pruritus may be due to disorders in the general health, metabolism, reproductive organs, rectum, urinary apparatus and skin. It may also accompany normal physiologic processes like menstruation, without any demonstrable pathologic change. Hence, every patient with pruritus must be examined carefully and completely to discover all factors that may be contributory. The entire treatment is based on the results of these examinations. In discussing the question of treatment, we shall limit ourselves to those therapeutic measures that we have found useful in the different varieties of pruritus.

GENERAL MEDICAL DISORDERS

One always thinks of diabetes in connection with pruritus. Strangely, very few of my cases have had glycosuria or any disorder of the sugar metabolism. Hence, in my experience, diabetic pruritus is far outranked by others in frequency. The treatment of diabetic pruritus is primarily medical, to control the diabetes. Local therapy is often necessary and usually helpful, as the pruritus may continue to annoy after the sugar metabolism has been adjusted. Such therapy is usually simple, for, as a rule, any bland ointment generally gives relief. If it does not, the patient should consult a gynecologist before the pruritus becomes a fixed habit.

POSTMENOPAUSAL PRURITUS

This is one of the common forms of pruritus. It is seen in elderly women, in whom the labial

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*From the Department of Gynecology of the Johns Hopkins University and Hospital.

skin has acquired the characteristic senile atrophy with wrinkling, marked sensitiveness and dryness. Also, there may be the typical changes in the vaginal epithelium that follow the menopause, with the well-known senile vaginitis, irritation and discharge. Hot flushes and nervousness aggravate the local itching and create a vicious cycle which gets progressively worse.

The same situation may be found after the artificial menopause, whether induced by surgery, irradiation or disease.

In such cases, it is unwise to jump at the conclusion that the only cause of the pruritus is an endocrine deprivation, simply because there are other menopausal symptoms or because the patient has passed the menopause. That conclusion, however, is not always justified because all other causes of pruritus may exist in the elderly. Hence, even when menopausal symptoms are present, a complete examination is essential. If any local factors are found, they should be treated.

The endocrine treatment of postmenopausal pruritus is usually helpful, especially if it is adequately supported by local therapy and mild sedation, when necessary. In these cases, endocrines may be given by mouth, hypodermically, as vaginal suppositories or by inunction. We shall discuss the local administration of the endocrines.

Vaginal suppositories containing estrogens are particularly helpful in the senile types of pruritus. The benefit is two-fold. It is due, in part, to the soothing effect of the suppository on the irritated tissues, and also to the stimulating action of the estrin on the epithelium. The epithelium of the vagina gets thick and normal, the discharge disappears and the pruritus may go with it.

Recently, in cases in which the vagina appears to be normal, and in which the irritation is located entirely in the external skin, I have been using stilbestrol in oil as an inunction. This is applied in the office and the patient is given a small amount to apply frequently at home, several times a day. She is told to rub in some of this oil wherever there is any itching, and to use it whenever the itching returns. The benefit of this therapy has been definite and sometimes remarkable. The dry, irritated skin gets softer and healthier. Scratching is eliminated. The treatment is also psychologically beneficial because the patient has something positive to do rather than the negative command to refrain from an impulse that is usually irresistible.

In these cases of postmenopausal pruritus, the local use of estrogens may be supplemented by the oral or hypodermic use of estrogens. Also, sedatives such as sodium bromide or phenobarbital are helpful.

If this therapy is not beneficial, it should not be continued indefinitely. We should make a careful search for some local factors that might require attention.

THE LOCAL TREATMENT OF PRURITUS

In discussing the treatment of the many local conditions that cause pruritus, we shall first mention merely the common disorders that are usually obvious and that are to be eliminated first of all.

Among these common conditions are the many disorders that cause irritating vaginal and cervical discharges; it is futile to treat the skin condition until this leukorrhea is cleared up. The therapeutic discussion of this problem would take us far afield, for it would include the treatment of the various forms of cervicitis and vaginitis, childbirth injuries, the varying degrees of prolapsus with exposure of the vaginal mucosa to trauma and irritation, trichomonas infections, urethritis, bartholinitis and many other causes of vaginal and cervical irritation. Sometimes these foci of irritation are not easy to find. Their elimination is usually necessary, however, before the pruritus can be controlled.

Similarly, rectal irritations and discharges are to be corrected. Hemorrhoids, fissures, proctitis and rectal polypi are to be eliminated. Intestinal parasites also may cause pruritus.

Having thus eliminated any pathologic conditions in the cervix, vagina, urethra and rectum, we now have the group of cases of chronic pruritus which cause us much trouble.

In these cases, one finds a variety of lesions in the external genitalia and skin. We shall list a few that seem to us most significant.

(1) *Lesions of the Clitoris and Prepuce.*—In any case of obstinate pruritus, we must examine these structures carefully; also, it is wise to inquire whether the itching starts in these organs. If this is the center of irritation, one is almost sure to find some organic cause for it. There are often adhesions around the clitoris and prepuce which hide the clitoris. After separating these adhesions, one often finds hard bits of sebaceous material deep in the folds around the clitoris. The separation of these tissues and

thorough cleaning of this area almost always brings some relief.

There may be hair follicle infections or tiny furuncles. In some cases the skin looks parboiled or resembles a piece of purplish parchment, being thrown into folds with multiple painful fissures over the labia and perineum. In other cases, the skin looks practically normal, although it may change in a short time.

The prime object in the treatment of these various skin lesions is to get the skin into healthy condition. It is primarily a problem of wound healing, with particular attention to any individual factors.

In the ordinary cases of multiple hair follicle infections, acne or tiny multiple furuncles, the treatment is usually fairly simple. These conditions usually yield to the application of antiseptics like mercurochrome (20 per cent), yellow oxide of mercury ointment or similar substances. Occasionally, a very simple and bland ointment will bring relief after elaborate therapy has apparently failed.

In obstinate cases, or if there is a heavy mat of pubic hair, it is advisable to have the labia, perineum and pubis shaved. This greatly facilitates local care.

Leukoplakia of the labia may be very annoying. In a recent case, there was a white leukoplakic spot that covered most of the vestibule. This had been present for a year or more and there had been severe itching for several years. In this case, the local application of stilbestrol in oil was miraculously curative. The author cannot explain that result.

Such simple therapy, however, is futile in the treatment of the more resistant forms of pruritus, characterized by brawny induration, fissures, parchment-like skin and diffuse dermatitis. In this group, the author has found two methods of therapy that usually bring relief. The first is the use of a new colloidal astringent formed in the reaction of sulfonated meta cresol with formaldehyde ("negatan"); and the second is alcohol injection of the external genitalia.

"Negatan" is a very astringent drug which destroys inflamed epithelium, having very little effect upon normal tissue. After one or two applications to an inflamed surface, the diseased epithelium comes off like a sheet of thin paper, leaving a clean surface. This clean, fresh surface is then carefully dressed, using antiseptics and healing ointments. This is again a problem in wound healing.

Many such treatments may be necessary before the skin is restored to normal. If the pruritus has been present for years, several months may be required to bring relief. In these cases, patience and attention to detail are the keys to success.

In some very obstinate cases, such local treatment is probably futile. Under these circumstances, I use alcohol injection, after the method recommended by Stone. The result of this therapy is dramatic and usually beneficial.

The technic of alcohol injection is simple. The skin is shaved and prepared, as for any perineal operation. By means of a fine hypodermic needle, 95 per cent ethyl alcohol is injected under the skin, injecting about 3 or 4 drops at each point. The points of injection are about 8 or 10 mm. apart, all over the external genitalia or the parts that itch. The author has injected the prepuce, clitoris and labia minora without producing any slough.

Occasionally, pruritus extends up into the vagina. In one case, the pruritus was in the vaginal vault, around the cervix. This was relieved by alcohol injection.

The effect of alcohol injection is immediate. The labia have a sense of numbness, and normal sensibility may be lessened for some weeks. In my experience, alcohol injection is the most certain method of curing obstinate pruritus.

There are numerous other methods of treating pruritus. They are all, however, rather radical and the author has not yet found them necessary. Roentgen irradiation is used universally; the author feels that other less radical but perhaps more laborious methods should be tried before having recourse to irradiation. Also, vulvectomy, hypogastric neurectomy and other operations have been used and recommended. These are major operations; some are also mutilating. If they fail, the situation is generally worse than ever. Hence, less heroic measures should be tried first. If used faithfully, they will usually bring success.

In summary, therefore, the treatment of pruritus is based upon careful determination of the causative factor and study of the local lesions. Conservative local and general measures will usually bring relief, if applied with patience and due attention to details. The conservative treatment of pruritus may be laborious but is usually successful, if carried out properly and faithfully.

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DISCUSSION (*Abstract*)

Dr. Howard King, Nashville, Tenn.—It is my very definite impression that somewhere around 50 per cent of the cases of pruritus vulvae are purely neurogenic in origin, whatever that word may mean. It is the nervous background of the particular individual which has created a habit of rubbing or scratching that part. Dr. Hailey has already soundly attacked the question of pruritus ani et vulvae at this meeting. If you can eliminate diabetes, Trichomonas infection and local irritants, such as fiber or rubber, you immediately get into the neurogenic background. I am certainly sure, very sure, that I have on one occasion seen a woman who had surgical ablation of the vulva, and the whole cause of the trouble was that she had a daughter who was a social flop.

In most of these patients there is a neurogenic background which, if investigated properly, will reveal a cause. It may require the aid of a psychiatrist, but certainly if these patients are not taught to practice moral restraint, restraint from rubbing and scratching, you may expect all the changes of the thickened vulva, lichenification, and so forth.

The question cannot be attacked from any one standpoint. Certainly I think the estrogens play a part in the treatment, and the use of theelin together with thyroid extract has done the most good. The judicial use of x-rays is unquestionably of value.

The anesthetic ointments, I think, generally are to be bitterly condemned. As to the use of alcohol injections, for my part, I think they should never be employed. The condition can be handled without them. Most of all, I think a very large percentage of the patients must be treated locally, as I have indicated, but the background of the individual must be attacked in the proper way oftentimes to get any result at all.

Dr. J. W. Kelso, Oklahoma City, Okla.—We became particularly interested in this condition when an article appeared from Chicago, which reported doing a vulvectomy for chronic atrophic dermatitis of the vulvae. We thought that was a rather extensive and heroic way to treat a little itching, and we began giving these patients huge doses, or at least adequate doses, of estrogenic substances. We, for reasons of experimentation, refused the patients any other type of treatment.

I recall a woman who came in with atrophic dermatitis extending well down toward her knees, who had not slept without sedatives for several weeks. We took her immediately off sedatives and put her on estrogenic substance. The first night she slept two hours, the next five hours, and the next a full night. Within a relatively few days her dermatitis had disappeared without any other type of treatment.

Our experience with stilbestrol has not been with local applications. I recall a doctor's widow, whom I had under my care for this atrophic condition, to whom I gave stilbestrol hypodermically, who came back very angry because of the occurrence of a profuse greenish vaginal discharge, followed by bleeding, and then a persistent nausea and belching, which she had had ever since the one injection.

If these patients are going to respond to estrogenic therapy, they will do so within two or three days. They are given a very thorough investigation. If they do not respond, we feel then that they should have consultation with our dermatologist.

We do not confine these cases entirely to the woman with the atrophy of menopause, but we do believe, and we are confident, that practically one hundred per cent of the younger women will have histories of irregular periods, showing us, we feel, that they have an estrogen deficiency, and our investigation will somewhat bear out our opinion.

Dr. M. T. Van Studdiford, New Orleans, La.—Dr. King has spoken wisdom in very plain words. If, after elimination of local irritants, abnormalities of the orifices, foci of irritation and infection, the patient fails to improve, the cause is then within the cranium. It might be there because of the lack of estrogenic substances, but it is very often due to worry, worry over family losses; personal, physical, or financial losses; overwork or fear.

I usually ask my patients how many times they scratch between the time they travel from the bed to the bathroom. I suppose I see only the failures from the injection methods. However, there are failures with this method and no treatment is perfect. A related condition, namely, pruritus about the ears, is just as frequent and resistant to treatment. My method of therapy is tying the hands at night or during a nap, sedatives to cut the edges of unrest down to a minimum, removal of foci, removal of the patient to a new location for a change of scenery. I have seen patients get well when some relative or friend filled the sufferer's purse, or the company's financial condition improved. Often a whole family scattered over the country will get better or worse according to reports of a family "news disseminator," better if good news, worse if bad news is therein contained.

Dr. Wharton (closing).—I agree with the speakers who have condemned the anesthetic ointments. I have never found them helpful, except as palliative measures.

I also agree with all those who said that nervousness plays a large part in the condition.

It is perfectly true that the endocrines play a part. We do not know why a perfectly healthy girl will often have itching during the menstrual periods and at no other times. We do not know why a woman will have itching during pregnancy and at no other time. There must be a physiologic factor. It may be endocrine. One of the reasons why women have itching after the menopause is not only because of the fact that they have an endocrine disturbance, but also because they are nervous. The whole thing goes together. It creates a vicious cycle.

Now, I am sorry I cannot agree with some of the statements that have been made, such as the one about alcohol injection. During the past year, in my own practice, there are several people at least who have been cured of their chronic irritations, and who have been perfectly free of all symptoms since alcohol injection. They have always wondered why it had not been done long before. Some of these had been suffering for nine or ten years.

I can also point to one or two who have obtained no relief from the same procedure, just as they have

not received relief sometimes from appendectomy; but you do not condemn appendectomy for that reason.

Now, as to the administration of estrogens: I think any effect that is obtained within twenty-four hours is purely psychological. It takes, according to histologic study, about ten to fourteen days for the vaginal epithelium, the skin or any tissue to react to the use of estrogens. If you are going to expect any benefit from the drug, you have to get the anatomical benefit and result of it. If you examine smears after estrogenic therapy you find the vaginal epithelium does not change, the discharge is not relieved, and there is no increase in glycogen until perhaps ten or twelve days have passed. Any benefit that you get before that is either psychological or due to a local application.

I realize that talking about pruritus is like talking about the weather; there are many things that affect it. There is no use in getting dogmatic about it. In my own practice, the same patient will be treated a dozen different ways in the course of her therapy until she is well. I have had, I think, fairly good luck in it, and for that reason I am just giving you the haphazard, simple, often incoordinated method of treating pruritus which has worked in many cases for me; and I have carried some of them to the bitter end and given alcoholic injections with benefit.

EASIER AND SAFER CATARACT EXTRACTION*

By F. Maxey Cooper, M.D.
Oklahoma City, Oklahoma

About 14 years ago, when I was being introduced to cataract surgery, few of the safety measures now in vogue were in general use. The usual procedure was to place a few drops of cocaine in the eye, insert a speculum and make the incision with a Graefe knife, including a little flap of conjunctiva which was not sutured. If the rest of the operation could be completed without the patient's squeezing the lids or making sudden awkward movements embarrassing to the operator, the eye was closed with a sigh of relief. Since that time better methods of anesthesia and better closures of the wound have been generally adopted which have definitely added to safety.

In this paper there is not time to discuss the literature on anesthesia nor to take up the numerous types of flaps, conjunctival bridges and methods of suturing which have been advocated. Nor can I present anything new, but I should like to describe the procedure now in use on our service at the University Hospital by my colleague, Dr. James Reed, and myself.

We class ourselves as occasional operators. We do not operate daily nor even every week. Consequently, we approach a cataract operation burdened with a certain amount of tension. Tension and shaking hands do not do the best work. The easier the operation, the less tension, therefore procedures which require less skill are, other factors being equal, preferable. They produce less nervousness. We cannot count upon having a skillful assistant, consequently we try to do a one-man job as nearly as possible.

The patient is anesthetized thoroughly. We infiltrate the orbicularis, inject above the superior rectus, and do a retrobulbar injection. A patient who is not being hurt has no reason to be a bad patient.

The lids are held open and the eye held turned down by silk sutures. The upper suture is passed under the superior rectus and holds the eyeball looking down. The sutures are attached to the head drapes by hemostats at the desired tension. If it should be necessary to close the eye quickly a shift of the head drape takes the tension off and the eye can be closed without removing the sutures. Since using them, I have had no occasion quickly to close the eye.

We use a large prepared flap of conjunctiva with the sutures inserted before the eye is opened. This flap covers the lateral portions of the incision as well as the superior. It can be closed quickly and when it is closed there is no part of the wound to gap open. The presence of the flap so easily and firmly closed adds to the assurance of the operator.

Since with a flap of this size a knife incision is unhandy, we adopted the keratome incision widened with scissors. This requires much less skill than a knife incision. The scissors guide the incision just where it is wanted and the iris is never disturbed. This has proven so satisfactory that I shall never again make a knife incision taking in two-fifths of the cornea. If I used a knife I would make a very short incision and widen it with scissors.

A round pupil looks so much better than an iridectomy that I cannot resist it in uncomplicated cases with the pupil well dilated. The iridotomy should be made before delivering the lens, however, since if vitreous presents it is difficult to grasp the iris without causing more loss. Stab punctures of the iris, after delivering the lens, have resulted in a number of prolapses in my hands and I have given it up. De-

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*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

livery of the lens is easier after an iridectomy and generally I believe it is a little safer.

We prefer the intracapsular operation in uncomplicated cases over 50 years of age. Under 50 it is our rule to bite out a large piece of capsule with toothed forceps. Under 50 the zonule is apt to be tough and to require a good deal of pressure to break it. For an intracapsular extraction, we use Arruga forceps and counter pressure. If we cannot grasp a slick capsule or if the capsule breaks we resort to toothed forceps to remove a section of capsule and have lost nothing in the attempt at an intracapsular.

After the lens is delivered the flap is closed by drawing up one or both sutures. Irrigation and reposition of the iris are carried out under the flap.

I do not wear gloves ordinarily, as I can manage silk thread and small forceps better without them. If properly handled, parts of the instrument entering the eye are not touched by hands. There have been no infections on my service traceable to not using gloves.

The following tables show the results of this operation. They are based on a review of one hundred consecutive unselected cases on the charity service of the University Hospital. Some of these were performed by the residents. There was some variation of technic, but all were done using the flap and sutures illustrated and the keratome incision widened with scissors.

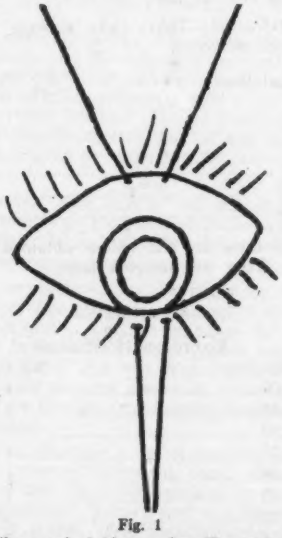

Fig. 1

The eye is held open by silk sutures. The upper suture is passed under the superior rectus muscle, the ends spread apart and attached to the head drapes by forceps at the desired tension. The lower suture is inserted in the skin of the lower lid near the lash line, the ends drawn together and clamped to the drapes by a single forcep.

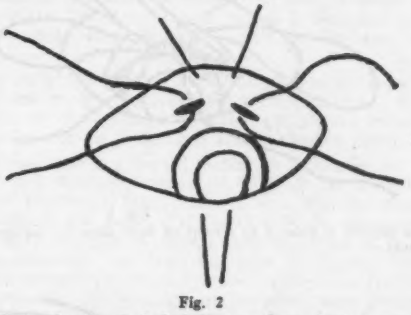

Fig. 2

The conjunctiva is incised in two places about 3 mm. above the limbus and sutures are inserted before widening the incision to insure proper placement. The upper portion of the suture catches some episcleral tissue.

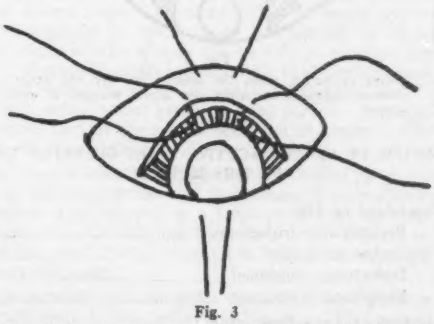

Fig. 3

The incision is completed and the flap of conjunctiva undermined to the limbus.

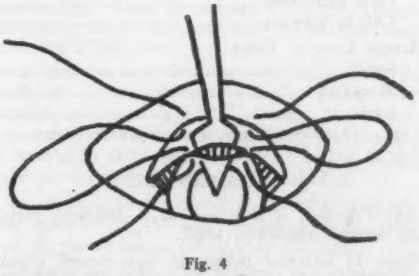

Fig. 4

Due to the width of the flap a keratome incision is easier than a knife incision.

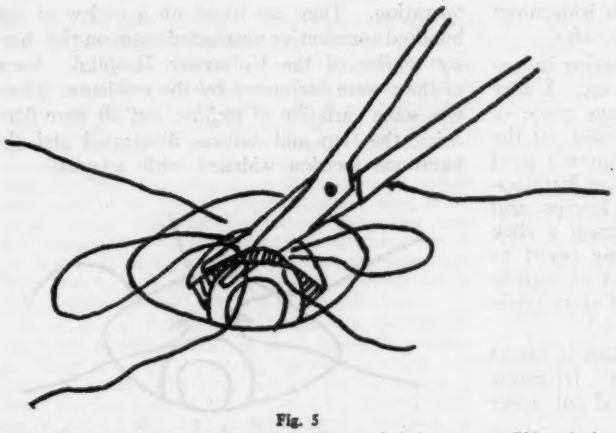

Fig. 5

The incision is widened by scissors on both sides to include over two-fifths of the cornea.

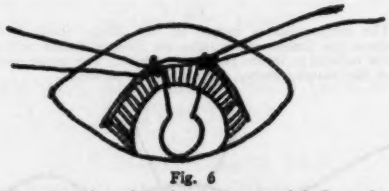

Fig. 6

After extraction when the sutures are tied the entire corneal incision, including the lateral margin, is well closed.

REVIEW OF 100 CONSECUTIVE CASES OPERATED UPON BY THIS METHOD

Treatment of Iris	
Preliminary iridectomy	1
Simple extraction	1
Iridectomy combined	70
Peripheral iridotomy	28
Method of Lens Extraction	
Intracapsular	56
Extracapsular	41
Loop extraction	2
Lost in vitreous	1
Vitreous Loss, 12 Cases	
Small	9
Moderate	2
Large	1

(Liquid vitreous and loop extraction)

COMPLICATIONS

Iris Prolapse, 3 Cases.—Case 4 followed peripheral stab wound iridotomy, small.

Case 14 followed peripheral stab wound iridotomy, gave oval pupil.

Case 81 followed complete iridectomy. Vision is 20/30.

Postoperative Hemorrhage into Anterior Chamber, 3 Cases.—All cleared with no ill effects.

Detachment of Choroid.—One case followed intracapsular operation. Lost contact with patient.

Prolonged Striate Keratitis, 1 Case.

Lens Lost in Vitreous, 2 Cases.—In Case 60, the lens nucleus slipped upward under the iris on attempt at expression and was left in the vitreous. Six weeks later the lens appeared in the anterior chamber and was removed. The result was good.

In Case 74, the lens was lost in the vitreous. Loop extraction was unsuccessful. Left in vitreous. Healed well. Could count fingers on discharge.

Postoperative Panophthalmitis, 1 Case.—The eye was enucleated.

Secondary Postoperative Glaucoma, 1 Case.—The vitreous was liquid and started oozing on incision. Loop extraction. The eye was later removed.

Postoperative Iridocyclitis, 3 Cases.—All were mild and eventually cleared.

Pupillary Membrane Formed, 3 Cases.—Two cases had posterior synechiae before operation. One case followed slight vitreous loss.

Cases Refracted.—Thirty-eight patients returned to the clinic for refraction.

Visual Result	No. Cases
20/20	13
20/30	11
20/40	4
20/50	3
20/100	5
20/200	1

Many of these are the visions obtained at the first refraction. They will improve later.

ASTIGMATISM

Record on 37 Obtained

Diopters	No. Cases
0.00	1
0.25	2
0.50	2
0.75	4
1.00	3
1.25	5
1.50	6
1.75	2
2.00	3
2.25	2
2.50	1
2.75	3
3.00	1
3.25	2

Average 1.53 D.

CONCLUSION

Two eyes were enucleated. One of these was a postoperative glaucoma in an eye with liquid vitreous.

One was a postoperative panophthalmitis. The surgeon wore gloves. The other eye infections occurred at about that time on other services and after thorough supervision of the nurses preparing solutions no more occurred. This was not thought to be due to a fault of the operator.

Only four other serious complications arose which were results of the operative maneuvers. It is questionable that the operator was at fault in some of these.

Considering that some of these operations were first operations by residents, we feel that 94 per cent satisfactory operative results are not too bad.

We recommend this type of operation, especially to occasional operators, as the easiest that we have been able to devise.

DISCUSSION (*Abstract*)

Dr. B. Y. Alvis, St. Louis, Mo.—First, let me commend Dr. Cooper and his colleagues on their excellent results. Any series of 100 consecutive cases that shows 94 per cent satisfactory outcome, with 3 per cent iris prolapse, 3 per cent anterior chamber hemorrhage, two lost eyes, one panophthalmitis, and so low an average astigmatism, is a series any operator can be proud to report.

I wish to second most heartily the reasons given for choosing the easy steps that can be undertaken by the beginner or the occasional operator with a minimum of fear and its consequent trembling.

Too much emphasis cannot be put upon thorough anesthesia. Very few patients are unruly if there is no pain, also rarer still is the one who can be perfectly cooperative if being sharply hurt. There may be no voluntary movement, but the uncontrollable tension on the extraocular muscles results in untimely movement of the globe upward, or a pressure that may cause vitreous to present.

The retrobulbar injection is one of the most important safety factors presented in recent years. Occasionally an orbital vessel may be struck, resulting in retrobulbar bleeding and proptosis. I have seen this happen three times. When it occurs, it is imperative to postpone the operation several days till the proptosis subsides. If the extraction is carried out at once in the presence of retrobulbar bleeding, the retrobulbar pressure causes gaping of the wound, iris prolapse, and perhaps massive vitreous loss.

A preliminary dose or two of a sedative, such as phenobarbital, the night before and pentobarbital an hour before operation, does much to bring the patient to the table calm and without apprehension. Sometimes the operator may do well to take a little of the babiturate himself, if he is inclined to be tense, with hands tremulous. One and one-half grains of pentobarbital sodium, or two grains of ipral calcium will help to relieve the inward tension that lays hold of the occasional operator or the beginner, and will do away with the tremor. After a few operations without tremor, the fear of trembling disappears, and with it much of the tension. When the mental hazard is overcome and confidence is gained, the spirit is calm and the hands do not shake.

The use of the superior rectus suture to rotate the eye down and retract the upper lid is commendable. The akinesia of the lid must be good and should include the eyebrow if the patient has a heavy mobile brow.

The speculum is a hazard that must be handled by a skilled and watchful assistant if vitreous loss is to be avoided regularly. Many times I have seen the anterior segment well rounded at the close of the extraction and toilette, collapse to show a concave cornea as soon as the speculum was removed, even though no hint of pressure had been evident before. This shows vividly the pressure of the speculum on the globe, even though the patient was quite tractable.

The preformed conjunctival flap can be prepared to cover the upper part or all of the incision at the will of the surgeon, which is a feat beyond the skill of most surgeons of average skill. The difficulty of making a correct section complete with one sweep of the knife is attended by the emphasis laid upon it by all the great surgeons who discuss the technic of cataract surgery. The small initial incision with knife or keratome, enlarged with scissors, is so much easier that I feel no one need worry about getting a good section. The scissors-made part of the wound heals just as kindly as that made by the knife.

The section must be large enough, including a full half of the circumference of the cornea, if intracapsular extraction is to succeed in a large percentage of cases. The delivery of a full lens through a small opening requires too much force, resulting in broken capsules and vitreous prolapses.

It is certainly safer to place the sutures and perform the iridectomy before delivery of the lens. The corneoscleral suture, such as the Stallard suture, or even better the one described by McLean recently, add much to the safety of the closure, the toilette, and the postoperative healing. These sutures are not easier to place, but they make closure so much more secure that they are worth the added effort.

Little reliance can be placed upon conjunctival sutures to prevent or control vitreous loss, iris prolapse, or postoperative opening of the limbal wound. The corneoscleral suture is much more dependable, and permits greater freedom in allowing the patient to be out of bed at the end of twenty-four hours or even earlier.

The conjunctival sutures should be added to approximate the margins of the conjunctival wound. They should all be placed before delivery of the lens.

The intracapsular extraction requires a considerably greater degree of operative skill than the classic extracapsular technic. The immediate results are more satis-

factory and make it the operation of choice for the surgeon who has the opportunity to acquire the necessary finesse. In those cases where the lens is intumescent or the capsule slick, I sometimes make a tiny puncture of the lens capsule at its upper margin with the point of the Graefe knife. This loosens the capsule so it can be grasped firmly with the arruga forceps, and it usually comes away in toto, even though some lens substance is spilled into the anterior chamber.

Dr. C. Dwight Townes, Louisville, Ky.—We are not trying for speed records in cataract operations. Safety of the patient and a functioning eye with restored vision are our goal. Anything that promotes safety should be sought by all of us.

Dr. Cooper's strong emphasis upon sedation and preoperative preparation of the patient is most important. Our patient should be in such state of mind, should be in such state of sedation that he does not want to move his eye. In addition he should be in such a state of anesthesia and akinesia that he could not move his eye if he wanted to. The retrobulbar injection adds greatly to the state of quietude and sedation and anesthesia of the patient. Akine ia of the lids is most important.

Another method of producing good fixation and quiet is with the use of a Guist-Black speculum. Not only does it give perfect fixation and immobility, but it also removes the objectionable feature of pressure upon the globe. Adjustment of the speculum raises the lids away from the eyeball so that there is no pressure whatsoever. This is a valuable instrument, in my opinion, and has worked very satisfactorily for us.

In addition, the superior rectus suture can be tied to a loop on the Guist-Black speculum, turning the eyeball downward and maintaining it in a satisfactory position. Sometimes, even in a deep set eye where it is difficult to grasp the internal rectus with the fixation forceps, I have been able to make the section without fixation forceps.

Dr. Lancaster some time ago, in discussing the subject, said that three point fixation was desirable in cataract surgery. His first point of fixation was the optic nerve. The second point was fixation forceps, grasping either the medial rectus or any other point of choice. The third point of fixation was the superior rectus suture.

I think it is essential to use some sort of suture to close the wound. All of us, I believe, are agreed on that point. Conjunctival sutures are good, a sclero-conjunctival suture is better, and a sclerocorneal suture probably is best of all.

However, the thing that all of us should strive for is to develop a technic at which we can become proficient, and to follow that technic, developing ourselves to the highest of our ability in doing the type of operation that is easiest for us and safest for the patient.

Dr. Cooper (closing).—On the method of cataract extraction it seems to me that men can be divided into two groups. One group says, "Let's select one procedure and by constant practice become very proficient in its use." Another group says, "Let's try everything new that promises to be better and eventually evolve a better operation."

I believe we should belong to the latter group.

SCLERAL-CORNEAL-SCLERAL CATARACT SUTURE*

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In the cataract suture which I use there are three points of anchorage, two of which are in the sclera, made through the conjunctiva. The other is in the cornea. The Kalt type needle or the atraumatic tapering needle with 6-0 silk, either single or double armed, may be used. With the single armed suture the first anchorage is made through the conjunctiva into the sclera, starting about 3 mm. above the limbus and 1 mm. to the side of a vertical line from the center of the cornea. The needle is directed along the 45 degree angle towards the temporal side of the cornea in the right eye and the nasal side in the left eye, penetrating the superficial layer of the sclera sufficiently to get a firm anchorage. The second anchorage is made in the cornea parallel to the upper limbus, entering directly below the point of entrance of the first anchorage above, penetrating the superficial layers of the cornea for about 1.5 mm. The third anchorage is made through the conjunctiva into the superficial layers of the sclera just as the first anchorage was made, but from below along the 135 degree angle to converge towards the entrance of the first anchorage. The suture diverges from the knot above downwards towards the lateral sides of the cornea, then converges as it crosses the limbus to the corneal anchorage. The first portion of

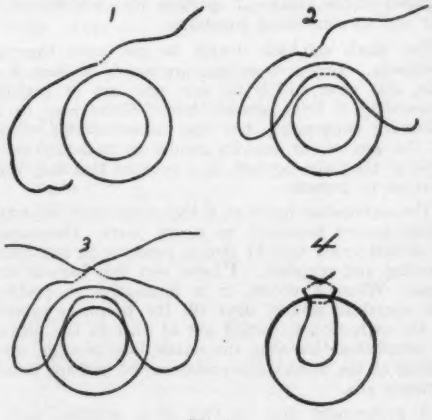

Fig. 1

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the tie is then made and the suture draped over the cornea so as to leave sufficient space for the incision. When a double armed suture is used the corneal anchorage is made first.

The advantage of this suture over the Liegard and the Stallard suture is in this second anchorage in the sclera. These two scleral anchorages act as pulleys and receive all the pull when the first portion of the tie is tightened, causing the corneal lip of the wound to become quickly and evenly approximated to the scleral lip. There is not that extra hazard of pulling unevenly upon the ends of the suture and causing the wound to gape just at this time when it is necessary that a quick, firm closure of the wound be made. Also, when the first portion of the tie is made the two scleral anchorages prevent slipping of the knot and there is now no haste to make the second portion of the tie, but more time is allowed properly to adjust the suture to the correct tension.

In removing the suture, the wound-crossing portion of the suture, by not being vertical, can be more safely cut should the eye be suddenly rotated up. After it is cut at a wound-crossing portion an end of the suture at the knot can be grasped and pulled, and again the pulley-like action of the two scleral anchorages prevents any pull upon the cornea that might reopen the wound.

The knot, by being placed upon the conjunctiva well above the wound, cannot irritate the wound, but becomes partially buried by the edematous conjunctiva and the objectionable foreign body sensation frequently complained of is greatly eliminated.

REVIEW OF RECENT RESEARCH ON DRUG PROPHYLAXIS AND TREATMENT OF MALARIA*

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This review was prepared as a report to the Sub-Committee on Medical Research and the period covered is from September 3, 1939, to September, 1940. It includes only the examination of the literature available in Panama and contacts with local workers and visiting scientists. Representative reports from various parts of the world have been selected and only those drugs are discussed which show some promise of availability at a reasonable cost.

This year's survey continues to indicate that the popular drugs are quinine, atabrine and plasmochin.

Castellani[1] adds a report on the prophylactic use of quinine in the Italian forces during the Ethiopian campaign. The total force numbered 500,000. Throughout the war there were but 1,241 hospital admissions for primary malaria and 1,093 for relapses. He attributes this low incidence to the use of prophylactic quinine which was rigidly enforced. Each man received 0.6 gram (3 tablets) of quinine bihydrochloride or sulphate each day.

Pansini[2] reports on 7,400 Italians invalided from East Africa to an institutional center in Italy. These patients were received in a period of thirteen and a half months and 3,500 of them had malaria. Attacks occurred in spite of prolonged quinine prophylaxis. *P. vivax* was more commonly observed than *P. falciparum* in the proportion of four or five to one. Most of the patients were discharged after an average stay of 3 months fit for work, but a reduction of the enlarged spleens to normal proportions rarely occurred.

Boyd and Kitchen[3] recorded observations on some patients in the Florida State Hospital undergoing malaria therapy. They studied the effect of small amounts of quinine administered on a single day on the subsequent course of infections with *P. vivax* and *P. falciparum*. A single dose of 20 grains of quinine had very little effect on the strains of *falciparum*. A dose of 11 grains or more suppressed paroxysms and induced periods of clinical quiescence, of varying duration, in the large majority of *vivax* cases. A declining trend in parasite density which lasted several days was also noted. Nothing comparable in *falciparum* infections was noted even after a dose of 20 grains.

Teichler[4] used atabrine prophylactically on 500 natives of East Africa, in a highly malarial district, with atabrine for 3 days, one tablet of 0.1 gram three times a day. On inspection the following week he found that 10 complained of fever, 4 of headache, 1 of giddiness and 1 of weakness. He considers that by giving such short courses he can maintain the health of the labor force.

Kostic and Antic[5] report the prophylactic use

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of atabrine in an endemic malaria region in Jugoslavia on 240 prisoners and warders kept under strict surveillance. The observations were made over the whole malaria season, May to October. The people were divided into two groups, of which 86 untreated persons acted as controls, and 154 people were treated. The ages were all between 21 and 60 years. The drug was given in 0.4 gram doses per week, half of the total being administered on two successive days. At the start of the experiment the percentage showing parasites in the blood was 7.5 and at the end it fell to 0.8 per cent in treated cases. Amongst the controls the percentage of infected cases was fairly constant and rose to 46.7 per cent in August. There were no ill-effects from the use of the drug and all treated cases were able to continue at work.

Canet[6] believes that synthetic remedies are undoubtedly more effective than quinine. A serious outbreak can be suppressed almost immediately by the administration to a village population of "quinacrine," 0.30 gram a day (adult dose) for three to five days. The working capacity of a labor force can thus be quickly regained, but after a few weeks conditions relapse to their former severity in the absence of a follow-up treatment. In general, administration once a week was found necessary and sufficient. His experience did not show that the association of a gametocide with "quinacrine" served any useful purpose.

Casini[7] reports three years of experience in Sardinia. His general conclusions are that by atabrine or quinine prophylaxis, especially if this be continued through the inter-epidemic period, accompanied by prompt treatment of all febrile attacks, it is possible to reduce malaria symptoms, spleen rates and parasite rates, and to effect a marked improvement in the health of a population, but it is not possible by these means to eradicate malaria.

Clark, Komp and Jobbins[8] report the tenth year's experiment in drug control among six Chagres River villages. About half of the people were treated with quinine-plasmochin and the other half with atabrine-plasmochin. Quinine sulphate tablets, 15 grains a day, were given for a period of five days. Atabrine tablets 0.1 gram, three times a day, were administered over a period of five days. In each group, after these courses were given, plasmochin 0.01 gram twice a day for five days was administered.

Monthly thick blood film surveys were used to measure the results and discover those who required treatment. The average monthly parasite rate for the atabrine-plasmochin group was 11.5 per cent and for the quinine-plasmochin group 12.7 per cent. The cumulative parasite rate over a period of 12 months was 55.5 per cent and 57.3 per cent, respectively.

Madden Dam Highway people (control) averaged 32.7 on four surveys while Rio Pescado, a control group, on a similar arm of Gatun Lake to that occupied by the experimental villages, was 65.1 per cent.

The atabrine-plasmochin group was visited by a member of the staff once a week, while the quinine-plasmochin group received but one visit by a staff member. Both places were well attended by native girls and the native river supervisor and boatman.

The cumulative result of 12 consecutive monthly blood film surveys shows that more than half of the two groups were positive for malaria at some time during the year. The relative incidence of new infections, and relapses, is still a debated question. Three facts support the opinion of these workers that most of the positive cases of malaria were due to relapse rather than new infections: (1) the infant rate for the year for initial infections was 2.5 per cent. (2) During the year, the parasite rate in the children (15 years and under) and in adults were almost equal in the drug controlled towns, while in uncontrolled rural villages in endemic centers the children's rate is, usually, almost double that of the adults. (3) Most of the positive blood films were obtained from the same individuals living with the same family and sleeping in the same house. Such individuals perpetuate the disease in their locality and repeated treatment seems never to eradicate the infection, although good clinical results are obtained. The species of malaria parasites found were *P. falciparum*, 72 per cent; *P. vivax*, 22 per cent; *P. malariae*, 6 per cent.

No deaths due to malaria occurred during the year. Ten years of experience in these towns leaves them with the impression that the drug control method cannot eradicate parasites in all cases and that epidemics cannot be prevented if circumstances occur that produce abundant anopheline mosquitoes. These methods have been successful in keeping the inhabitants fit for duty and in reducing clinical cases of malaria to a very low incidence. They are of the opinion that quinine and atabrine are of equal therapeutic value as antimalaria drugs. Their people prefer atabrine but quinine is much less ex-

pensive. They do not believe that plasmochin simplex has played a very important role in reducing transmission and preventing epidemics. They conclude that non-medical personnel can carry out reasonably good drug control measures, without the blood film surveys, if the personnel can be supervised by a qualified physician who is interested in tropical and industrial medicine. Weekly visits by a physician make it possible to recognize and correct the management of other infectious diseases before they spread in an epidemic fashion. Drug control is advised only for the temporary locations of labor camps and small villages where standard methods of malaria control of a permanent nature cannot be established. Expenditures incident to such drug control programs are economically justifiable, and will result in an increased labor efficiency commensurable with the financial outlay required.

Rashina[9] gives his experience in an attempt to control malaria in a town of 2,000 located near breeding places of a very active vector. At the start of his work the parasitic, splenic and endemic indices were 44.4, 44.7 and 63.7, respectively. All persons found harboring malaria were treated. In the spring all of those who had suffered from malaria in the previous year were treated ("acriquine" 0.1 gram three times a day for five days, with plasmocide 0.03 gram twice a day on the first and third day of treatment). All acute cases were treated in the same way. During the transmission season all persons who had had malaria were given plasmocide 0.03 gram twice a day on the first and fourth day of six-day cycles. The total number of malaria cases in the three years (primary cases, reinfections and relapses) were 661, 438, 233 respectively. Infants under 2 years of age showed a rate for 3 years of 50.4, 17.4 and 4.3 respectively. He concludes, nevertheless, that in view of the location with regard to the mosquito breeding areas that complete control will necessitate the adoption of anti-mosquito measures in addition to the drug treatment.

Malycheva[10] treated two groups of patients with "acriquine." One group was given 0.15 gram twice a day for seven days. The second group used the same doses, but they were given for five days, then an interval of rest for 10 days was followed with the same medication for 3 days, followed again by an interval of 10 days' rest, after which the 3 days' treatment was repeated: eleven days' treatment, in all, over a period of a month. The first group contained 168 patients and the second group 141 patients. The frequency of early relapses was almost the same in the two groups, 33.6 and 35.5 per cent respectively.

Dupoux[11] *et al.* report the use of "premaline" in Tunis. They gave the drug twice each month from June 1 to November 1. Those found with parasites were given curative treatment with "premaline." Prophylactic treatment was given to 27,126 in 1937 and to 26,906 in 1938. No anti-mosquito measures were undertaken. At the start of their work the parasite index for children was 21.9 per cent, for adults 17.6 per cent. At the end of the first year's trial these rates were 3.5 and 2.5 per cent. Patients treated with "premaline" and subsequently submitted to a bi-monthly administration of the drug suffered no relapses.

Niven[12] treated 80 cases with "prontosil" and 68 cases with quinine bihydrochloride. He decided that "prontosil" had some lethal action on plasmodia, but that it was much less efficient than quinine.

Chopra and Basu[13] fed 511 laboratory-bred *A. stephensi* on five crescent carriers before and after the administration of "prontosil" in various doses. As large a dose as 40 tablets failed to devitalize the crescents which developed to the sporozoite stage in a considerable proportion of the mosquitoes.

Menk and Mohr[14] studied the action of "prontosil rubrum" and "prontosil soluble" in 3 cases of benign malaria and 7 cases of malignant tertian infections. The first drug was given by mouth and the second one by injection. The results with both drugs were unsatisfactory. They state, however, that these results should not interfere with further research on the action of sulphonamide bodies in malaria and that possibly they might be found to have an action on the cycle of the malarial parasite in the reticulo-endothelial cells.

Chopra and Basu[15] report an experiment in which large numbers of *A. stephensi* were fed on three gamete carriers of *P. falciparum* before and after treatment with "cilional." A five days' treatment consisting of "cilional" 0.02 gram with atabrine 0.1 gram three times a day did not prevent the development of the parasites in the mosquitoes.

Marotta[16] concludes after his study of 24 hospital patients under treatment for malaria that adrenalin is without action on the manifestations of malaria, that it does not shorten the disease and does not reinforce the action of quinine. It does not prevent relapses. Intravenous

injections produce a contraction of the spleen which lasts from 3 to 4 minutes. No evidence was noted that adrenalin improved the blood or the patient's general condition.

Sinton[17] *et al.* report on "proseptasine," a benzyl derivative of sulfanilamide. In order to learn whether such malaria prophylactic properties as the drug might possess were causal (operative against sporozoites and intermediate forms between sporozoites and trophozoites) the drug was not continued later than the day following the application of infected mosquitoes to the patient. A Rumanian strain of *P. falciparum* was employed. From 15 to 20 infected *A. maculipennis* var. *atroparvus* were applied to each of 8 patients. Three patients each received 7.5 grams of the drug during the 24 hours before infecting bites and an additional 4.5 grams during the subsequent 8 hours. One of these 3 persons was positive on the twelfth day after the bites. An untreated control developed an attack on the eleventh day after the bites. Two patients received 12 grams of the drug during the 24 hours before the infecting bite and an additional 15 grams during the subsequent 32 hours. One of these patients developed fever and parasites 22 days after the infecting bite.

Three patients received 3 grams of the drug three times at four hourly intervals. One was bitten by infected mosquitoes immediately after the last dose, the second 24 hours later, the third 48 hours after the last dose. The first and last of these patients developed acute attacks of malaria after incubation periods of 15 and 16 days respectively. Thus of the 8 patients 5 showed no clinical or parasitologic signs of infection, though they had been under close observation from 4 to 5 months. "Proseptasine" appears to have a true causal prophylactic action against the strain in use of *P. falciparum*. In view of the precautions necessary in the use of sulphonamide compounds and the short duration of the prophylactic action observed, the observations have a very limited practical application.

DeCourt,[18] in discussing the pharmaco-dynamic bases of antiplasmodial measures, recognizes that they possess in varying degrees schizonticidal, gemetocidal and anti-sporogenic activities. In addition to these he describes a dysgonic action, a conception that is both parasitologic and clinical. Under the influence of this action schizonts lose almost entirely their power of asexual reproduction and gamete formation. From the clinical point of view, this action is manifested by the absence of morbid phenomena in spite of the presence of schizonts, sometimes numerous, in the blood. His article deals with "quinacrine." The mere presence of this drug in the blood is insufficient to explain dysgonic action. A very small dose given daily is much less potent in this respect than the optimum dose given at much longer intervals, although the total amount of the drug given by the former method may be greater. Thus a dose of 0.1 gram given on 3 or 4 days in the week is less effective than one of 0.3 gram given three times a month. The duration of this dysgonic action is not appreciably prolonged by increasing the optimum dose, even by large amounts. No relationship seems to exist between the curve of dysgonic action and that of the concentration of the drug in the blood or tissues.

Nikolajev[19] records the results of seven years' observations in Leningrad on 11,347 cases of naturally acquired malaria and 200 cases of experimental benign tertian malaria transmitted by mosquitoes. The patients were living in conditions which precluded a chance of reinfection.

The naturally acquired infections were listed as *P. vivax*, 9,464; *P. falciparum*, 719; *P. malariae*, 310. He states that the duration of malaria infections is limited:

P. vivax infections 27 months.

P. falciparum infections 20 months.

P. malariae infections sometimes persist for 3 to 4 years.

He thinks there is no reason to believe that the first two species can survive in the human host for indefinite periods. His experience with induced malaria leads him to conclude that prevalent ideas regarding the influence of season on the course of malaria infections is without foundation.

Gardner and Dexter[20] report the case of a woman aged 30 who had never had malaria nor lived in a malarious locality. This patient had a cold abscess incised and to combat postoperative weakness she was given two transfusions of 600 c. c. of whole blood. A month after the first transfusion she had an attack of clinical malaria with quartan parasites in the blood films. The donor of the first transfusion had had quartan malaria 17 years previously while with the Italian Army in Albania. He then returned to the United States and has never made trips farther South than Washington and Baltimore. He had

not had attacks of fever for 17 years and no parasites were found in his blood when he was used as a donor. In spite of this the authors believe that the donor gave the patient malaria. The patient recovered under treatment with sulfanilamide, 3.6 grams a day, for 17 days.

Lesné[21] *et al.* report the case of a 7-months-old infant ill with pneumonia who received an intramuscular injection of its father's blood as a part of its course of treatment. Two months later the child developed quartan malaria. The infant had never been outside of Paris. The father had left the Cameroons 13 years previously. He had suffered from fevers while in the Cameroons. He had had no fever since he returned to France 13 years ago and examination of his blood revealed no parasites.

Most[22] reports he had the opportunity, in a period of six years, to observe well over two hundred heroin addicts suffering from *falciparum* malaria contracted as a result of the common use of the hypodermic syringe for intravenous administration of the drug. He speaks of it as an endemic disease in drug addicts of the New York metropolitan area.

Hutton and Shute[23] warn the physician of the risk of transmitting malaria by blood transfusions. Their experience, based chiefly on malaria induced by infected mosquitoes, is as follows:

P. vivax may persist in the blood for 18 months after the primary infection.

P. falciparum will persist for at least 12 months.

P. malariae may persist for many years.

Latent cases of malaria cannot be diagnosed with certainty by any known method. Persons in good health may harbour parasites in sufficient quantity to transmit malaria if they serve as donors for blood transfusions. Keeping a donor's blood for days, or even weeks, at low temperatures will not destroy the plasmodia it may contain. Persons who have lived in places where malaria is endemic should not be used as donors if others are available.

Accinelli Fernandez[24] says that in the agricultural lowlands of Peru malaria is a serious labor problem and that malaria under such circumstances should be considered an occupational hazard. He urges the importance of including it in the list of professional diseases in the Workmen's Compensation Acts.

Sinton[25] has expressed himself on general principles regarding the treatment of malaria in different conditions:

"When infections are contracted by individuals resident under conditions in which the chances of reinfection, except at comparatively long intervals, are slight, the treatment of choice is one which produces a *radical cure* of the infection at the earliest possible moment.

"When individuals are resident under conditions where they are exposed to frequent and constant risk of infection, reinfection and superinfection, the object of treatment should be the rapid production of a *clinical* cure of each attack, and *not* a radical cure of the infection.

"When individuals are exposed only temporarily to chances of frequent infection and superinfection, then *clinical* prophylaxis of the disease with an appropriate drug is the treatment of choice."

This seems to the reviewer to be very sound advice.

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MALARIA MORTALITY IN THE SOUTHERN UNITED STATES FOR THE YEAR 1939*

WITH NOTES ON MALARIA IN OTHER STATES

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MALARIA IN THE SOUTH

Deaths from malaria in the Southern United States for the year 1939 showed the most encouraging decline since vital statistics on malaria have been compiled by state departments of health. Although it is not desirable to cast the mortality rates for the year until the official 1940 census figures have been released, it is both possible and desirable to compare the ratios of recorded autochthonous malaria deaths with those of previous years, particularly the immediately preceding year (1938), the recent and preceding mortality peaks and the intermediate low of the 5-7 year malaria mortality cyclic curve. These data are summarized by states in *Table 1*.

The tabulated data indicate that each state in the area, with the exception of Virginia, had a reduced malaria mortality between 1938 and 1939. Moreover, except for Alabama, Mississippi, North Carolina and Virginia, the totals are the lowest on record for the states of this area. Likewise, the total deaths of these fourteen states for 1939 are approximately 20 per cent less than for 1938 and about 30 per cent less than the low records between the recent and preceding mortality peaks.

When the data are broken down by counties it is found that 87.7 per cent of the 1,420 counties had either a smaller number or the same number of deaths in 1939 as in 1938. The exceptions to this favorable trend, by states, are as follows: Alabama, 13 counties; Arkansas, 14; Florida, 10; Georgia, 20; Kentucky, 6; Louisiana, 10; Mississippi, 24; Missouri, 11; North Carolina, 12; Oklahoma, 6; South Carolina, 8; Tennessee, 16; Texas, 33; and Virginia, 4. The only counties which showed significant rise in 1939 over the preceding ten-year average were: five in Alabama (Baldwin, Bullock, Dallas, Lowndes, Marshall); one in Georgia (Talbot); one in Kentucky (Hickman), and one in Mississippi (Noxubee). The increased malaria deaths in these counties, with the exception of Lowndes County, Alabama, suggest the spread of malaria along radii from hyperendemic centers. (Lowndes County, Alabama, has for several years been recognized as a focal center of malaria.)

MALARIA ELSEWHERE IN THE UNITED STATES

With the exception of the New England states

Table 1

IMPORTANT TRENDS IN MALARIA MORTALITY IN THE SOUTHERN UNITED STATES BY STATES (1922-1939) AS INDICATED BY REPORTED DEATHS

State	1939	1938	Previous Peak	Intermediate Low	Most Recent Peak
Ala.	203	218	430 (1929)	183 (1932)	343 (1936)
Ark.	262	365	868 (1928)	482 (1932)	905 (1933)
Fla.	112	164	470 (1929)	205 (1931)	445 (1934)
Ga.	101	144	677 (1929)	307 (1931)	606 (1936)
Ky.	29	32	56 (1928)	43 (1929)	75 (1933)
La.	116	187	269 (1927)	145 (1931)	426 (1933)
Miss.	221	268	553 (1928)	211 (1931)	699 (1933)
Mo.	66	72	156 (1928)	73 (1930)	140 (1933)
N. C.	60	79	183 (1922)	40 (1933)	150 (1936)
Okla.	48	84	174 (1928)	85 (1931)	115 (1933)
S. C.	170	222	371 (1929)	210 (1932)	456 (1936)
Tenn.	101	108	203 (1928)	110 (1932)	257 (1934)
Tex.	163	232	?*	227 (1930)	629 (1935)
Va.	6	2	45 (1925)	5 (1934)	17 (1936)
Total	1658	2177	4455+	2326	5263

*No information, since Texas was not in the registration area at the time the preceding peak occurred.

*Read before the National Malaria Committee, meeting conjointly with Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

*From the Department of Tropical Medicine, Tulane University of Louisiana School of Medicine.

and West Virginia, malaria is endemic in one or more foci in every state east of the Mississippi River. In the Plains States the Dakotas have no endemic malaria, and in the West, Wyoming, Montana, Utah and Nevada report only introduced cases.

Malaria deaths in Illinois have been appreciably lower (38-35) during the past three years (1937-1939) compared with the period 1918-1936 (89-53), but show evidence of rather widespread distribution, particularly in the southern counties and in those adjacent to the Mississippi and Illinois Rivers. In Indiana the number of reported malaria deaths for 1937 (21) was the highest since 1922, but 1938 and 1939 showed a marked improvement (9 and 8, respectively). Most of the deaths occurred in the southern third of the State. The increased deaths in Ohio in 1933, 1935 and 1936 (10, 9 and 9, respectively) have been followed by an appreciable decline in 1938 and 1939 (2 and 4). Several foci of malaria, with reported deaths, exist today in New York, Pennsylvania, New Jersey, Delaware, Maryland and Michigan. Endemic malaria in Wisconsin, Iowa and southern Minnesota is confined primarily to the counties bordering on the Mississippi River. Mild epidemics in the Upper Mississippi Valley occurred during the summer of 1939 and 1940.

Southeastern Kansas is malarious and an area around Beatrice, Nebraska, is regarded as a small endemic focus. In the irrigated region of Grand Junction, Colorado, malaria has become established; it has been known for several years to be endemic in several counties of New Mexico and Arizona and in a marshy area in Boise County, Idaho. In the San Joaquin and Imperial Valleys in California both endemic and introduced malaria constitute a serious economic problem. A few deaths due to locally contracted malaria have been reported from Washington and Oregon during the past decade.

In non-malarious states or those with localized foci, physicians and public health workers are becoming increasingly conscious of the cases of introduced malaria. This is particularly true of Maine, New Hampshire, Vermont and Colorado, where malaria patients are being increasingly sent to recuperate. Some of the Western states report the introduction of malaria from the Southern states in enrollees in CCC camps. Transient workers from the South and from Mexico are also frequently responsible for frequent outbreaks of malaria in the beet fields and cotton plantings in the irrigated areas of the West.

In all of the United States except the South, endemic malaria transmitted by mosquitoes is due to *Plasmodium vivax*. Imported cases from the South or tropical America frequently harbor *Plasmodium falciparum*.

SUMMARY

Malaria mortality in the Southern United States for the year 1939 was apparently the lowest on record; it was 20 per cent lower than for 1938 and 30 per cent lower than the previous low of the 5-7 year cycle of malaria mortality. In the relatively few counties in the South with significant increase in malaria deaths in 1939 over 1938 there is suggestive evidence of radial distribution of the infection from near-by highly endemic foci. Outside the South, Illinois is the only state with a significant number of malaria deaths during the past three years. However, many of the Northern and Western states have indigenous malaria. In Iowa, Illinois, Wisconsin and southern Minnesota mild epidemics developed in counties near the Mississippi River during the summers of 1938 and 1939. Moreover, transient laborers, CCC camp enrollees, tourists returning from the South and tropical America, as well as patients with malaria who are sent to the North and West to recuperate, all constitute increasing sources for introducing the infection into previously non-malarious localities.

STUDIES ON INDUCED QUARTAN MALARIA IN NEGRO PARETICS*

III. MEASUREMENTS OF THE PAROXYSMAL PHASES

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and
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There is little exact information on the phenomenon of malarial fever paroxysms. The pres-

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*Contribution from the National Institute of Health, Malaria Investigations, Williams Malarial Research Laboratory, and the South Carolina State Hospital, Columbia, South Carolina.

†United States Public Health Service.

‡South Carolina State Hospital.

ent study was undertaken to obtain measurements on the different phases of the paroxsyms of *Plasmodium malariae* in negro paretics.

In the first paper of this series (Young, Stubbs and Coatney,[1] 1940 a) it was shown that the asexual cycle in this strain of quartan malaria is of 72 hours' duration, the fever-peak of the paroxysms occurring during the late afternoon. In a later study (Young, Coatney and Stubbs,[2] 1940 b) it was shown that the time of sporulation of the parasites could be altered by changing the conditions of rest and activity of the host.

MATERIALS AND METHODS

The data reported here were obtained from the study of the USPHS strain of *P. malariae* used therapeutically at this hospital since 1932. The observations were made under conditions normally found on the malaria wards of a mental hospital.

All temperature readings were taken rectally at four-hour intervals unless the temperature was above 100° F., during which period it was taken every hour. If the temperature elevation was not accompanied by segmenting parasites, the fever was not considered as being caused by the malarial infection. Blood smears were made daily and occasionally more frequently.

Data were tabulated on the following phases of the paroxysms: proportion of chills to the paroxysms, the chill being defined as that part of the attack when the patient was actually shaking; the time from the beginning of the fever (100° F.) to the start of the chill; the duration of the chill; the length of time from temperature at the start and at the end of the chill; the duration of the chill; the length of time from the end of the chill to the fever peak; the time from the fever peak to the end of the fever (100° F.); and the total duration of the fever.

The data on 420 paroxysms occurring in 15 patients are presented in *Table 1.*

OBSERVATIONS

During the 420 paroxysms, observable chills occurred 102 times (24 per cent). Some patients experienced these chills more often than

Table 1

MEASUREMENTS OF 420 PAROXYSMS OF QUARTAN MALARIA

Patients	Fevers			Chills				
						Average Temperature °F.		
	Number	Av. Length Hours	Av. Peak °F.	Number	Av. Length Minutes	Onset	End	Increase
B. D.	25	12.2	104.7	6	38.3	100.8	103.0	2.2
P. H.	9	11.9	103.0	1	50.0	102.4	104.0	1.6
H. B.	14	9.1	104.8	9	43.1	102.0	103.9	1.9
J. Fo.	43	11.6	104.4	7	56.3	103.2	104.4	1.2
H. C.	17	11.9	104.3	3	43.3	101.8	104.2	1.4
M. C.	15	12.7	104.8	3	71.6	102.7	105.1	2.4
S. H.	20	8.2	103.8	10	53.5	101.2	102.3	1.1
R. J.	45	11.1	103.6	1	95.0	101.2	102.0	0.8
A. A.	5	9.0	103.7	1	90.0	101.4	104.4	3.0
J. R.	74	9.5	103.6	31	54.5	102.0	103.4	1.4
J. Fu.	25	12.0	104.1	2	47.5	102.9	104.5	1.6
B. F. B.	31	9.8	104.4	12	54.0	100.0	102.6	2.6
G. W.	52	12.2	104.6	13	47.5	102.6	103.8	1.2
W. B.	15	11.4	104.5	1	45.0	102.4	104.4	2.0
J. S.	30	12.7	104.3	2	65.0	101.1	103.1	2.0
Total	420			102				
Average		10.98	104.1		52.5	101.8	103.5	1.7

others; patient H. B. had nine chills in 14 paroxysms (64 per cent), but patient R. J. had only one chill in 45 paroxysms (2 per cent).

The temperatures at the beginning of the chills ranged from 97.6° F. to 106.0° F. with an average of 101.8° F. The temperatures at the end of the chills ranged from 97.8° F. to 106.0° F. with an average of 103.5° F. The greatest advance in temperature during a chill was found in patient B. D., whose temperature rose from 98.0° F. to 103.0° F. during a chill of 45 minutes' duration. In contrast, two patients experienced a recession of temperature during a chill. Patient G. W. had a temperature of 106.0° F. at the onset and 105.0° F. at the end of a chill, a loss of 1° F. during the 50-minute attack. Patient J. R. had a reading of 104.2° F. at the beginning and 103.2° F. at the end of a chill, a loss of 1° F. during an attack lasting 15 minutes.

The durations of the chills ranged from 13 to 195 minutes, with an average of 53 minutes.

The average fever-peak for the 420 fevers was 104.1° F. The highest single temperature recorded was 106.4° F.

The durations of the 420 fevers ranged from 5 to 32 hours, with an average of 10 hours 58 minutes. The average time from the beginning of the fever to the fever-peak was 4 hours 45 minutes; and from the fever-peak to the end of the fever was 6 hours 13 minutes.

The 102 chill-accompanied paroxysms were studied separately. The average peak temperature was 104.6° F. The lengths of the different phases were: from the beginning of the fever rise to the onset of the chill, 1 hour 42 minutes; length of the chill, 53 minutes; from the end of the chill to the fever-peak, 1 hour 14 minutes; from the fever-peak to the end of the fever, 6 hours 11 minutes. The total elapsed time for the paroxysms averaged approximately 10 hours (*Fig. 1*).

For the 318 paroxysms unaccompanied by chills, the average temperature peak was 104.0° F. The durations of the different phases were: length of the fevers, 11 hours 16 minutes; from the beginning of the fever to the fever-peak, 5 hours 2 minutes; from the fever-peak to the end

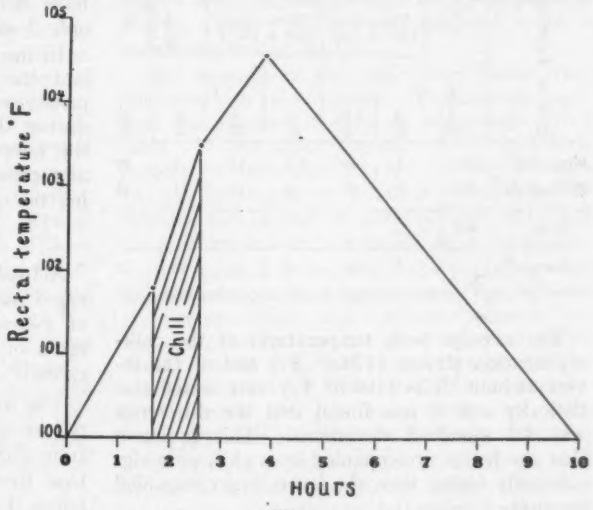

Fig. 1
The temperature curve and relationship of the chill in 102 paroxysms.

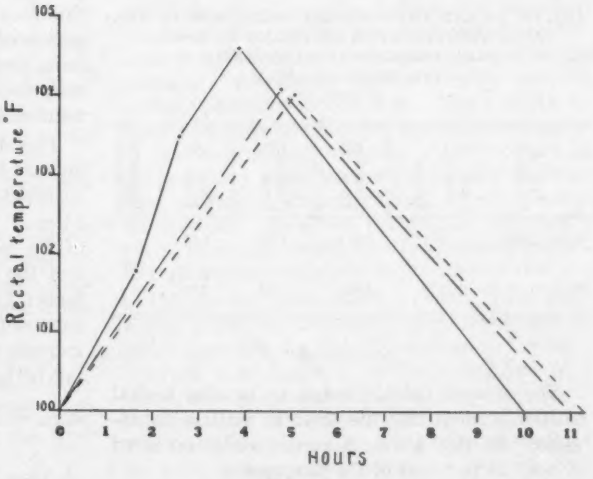

Fig. 2
The temperature curves of the 102 paroxysms with chills, the 318 paroxysms without chills, and the total 420 paroxysms.
——————————102 chill-accompanied paroxysms.
————— —————total 420 paroxysms.
— — — —318 paroxysms without chills.

of the fever, 6 hours 14 minutes (*Table 2, Fig. 2*).

Table 2

LENGTHS OF THE TEMPERATURE PHASES IN 420 QUARTAN MALARIA PAROXYSMS

Type of Paroxysm	Number	Time from 100° to Peak		Time from Peak to 100°F.		Mean Length	
		Hrs.	Min.	Hrs.	Min.	Hrs.	Min.
With chill	102	3	49	6	11	9	59
Without chill	318	5	02	6	14	11	16
Total	420						
Average		4	45	6	13	10	58

The average peak temperatures of the chill-accompanied fevers (104.6° F.) and of the fevers without chills (104.0° F.) were tested statistically and it was found that the difference was 4.3 standard deviations. This indicates that the fevers accompanied by a chill were significantly higher than the fevers unaccompanied by chills (*Table 3*).

Table 3

THE MEANS AND THE STANDARD DEVIATIONS OF THE PEAK TEMPERATURES OCCURRING IN MALARIAL PAROXYSMS ACCOMPANIED AND UNACCOMPANIED BY CHILLS

Type of Paroxysm	Number	Mean Peak Temp. °F.	σIndividual Temp. °F.	σMean Temp. °F.	Difference ÷difference
With chills	102	104.6	1.18	0.07	4.33
Without chills	318	104.0	1.06	0.10	

DISCUSSION

The general opinion seems to be that a chill usually accompanies the fever in malaria paroxysms. In this series, however, chills occurred in only 24 per cent of the paroxysms.

Furthermore, certain differences were noted between the two kinds of paroxysms. When a chill accompanied the paroxysm, the fever was significantly higher (4.3 standard deviations) and the duration of the fever was 1 hour and 16 minutes shorter. Upon examining the data (*Table 2*) it was found that this shortening of the fever period occurred almost entirely (1 hour, 13 minutes) in the period between the onset and the peak of the fever. The difference in the time from the peak to the end of the fever between the two types of paroxysms was only 3 minutes.

In the periods between the onset of the fever and the fever-peak in the chill-accompanied paroxysms, the temperature rose most rapidly during the chill. It required 31 minutes for the temperature to rise 1° F. during the chill, as compared to 42 minutes for a 1° F. rise during the other ascendancy periods.

SUMMARY AND CONCLUSIONS

A total of 420 paroxysms were studied in 15 negro paretics infected with the USPHS strain of *Plasmodium malariae*. Only 102 (24 per cent) of these paroxysms were accompanied by chills.

The average measurements for the total 420 paroxysms were: fever-peak, 104.1° F.; time from 100° F. to fever-peak, 4 hours, 45 minutes; time from fever-peak to the end of the fever, 6 hours, 13 minutes.

The durations of the temperature of 100° F. and above averaged 10 hours, 48 minutes. Using this as a measure, the total hours of fever experienced by a negro paretic undergoing malaria therapy with this strain (USPHS) of *P. malariae* can be estimated by multiplying the number of paroxysms by 10.8.

The chill seemed to exert a definite influence on the character of the paroxysm. When a chill occurred, the duration of the fever was shorter (1 hour, 16 minutes) due mainly to a shortening of the period when the temperature was rising and the maximal temperature was significantly higher (4.3 standard deviations) than in paroxysms without chills. The greatest proportionate increase in temperature occurred during the chilling period.

The authors gratefully acknowledge the help of Scientific Assistant William C. Hurly.

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TERTIARY SYPHILIDS OF THE NOSE*

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The late lesions of syphilis involving the nose are relatively rare, but when they do occur they are of special interest from the diagnostic standpoint. In this location, as elsewhere, syphilomas may mimic a wide variety of other conditions. They frequently produce rapid destruction of nasal tissue, so for cosmetic reasons it is important that their true nature be recognized as soon as possible. Complete examination reveals that a large number of these patients have other serious manifestations of their syphilitic infection, especially cardiovascular and central nervous system involvement. The future health of these patients as well as their facial appearance therefore depends upon their receiving proper and thorough antisyphilitic therapy.

The basis of this study was a series of 42 cases of late syphilids of the nose seen at the University of Michigan Hospital during the past 15 years.* These patients were from 26 to 76 years of age. The average age was 41, indicating that syphilomas of the nose are usually a condition of middle life.

One of the most interesting points noted was the predominance of female patients in this group. There were 31 females and only 11 males, a ratio of almost 3:1.

Almost all of these cases having involvement of the skin of the nose were cases of acquired syphilis. There were only two cases of congenital infection in the series. This was rather surprising at first, but brought out the fact that the typical lesion of congenital syphilis is an involvement of the nasal bones which usually does not extend to the skin.

The index of suspicion for syphilis by the referring physician appeared to be rather low for this type of nose lesion. Before coming to the hospital only 7 of the 42 patients studied knew that they had or had had syphilis.

The duration of the syphilitic infection, as accurately as could be determined, varied from 9 months to 40 years. The average duration of infection was 16 years, showing that this type of lesion is definitely a manifestation of late syphilis. As an exception to the general rule, a case deserves special comment in this regard: a woman had been seen with an active chancre of the vulva, but due to unfortunate domestic circumstances, she received only a short course of therapy. Eight months later she presented herself with the late destructive lesion seen in *Fig. 2, Case 9*. This was considered to be a precocious tertiary lesion.

The duration of the nose lesion varied from one month to twelve years. The average duration was thirteen months on admission. In 7 cases (17 per cent) the nose lesion had been present for more than a year. In only 13 cases (31 per cent) was the duration of less than six months, and in only 8 cases (19 per cent) had the nose lesion been present less than 3 months.

In 9 cases (19 per cent) the syphilitic skin lesions were confined to the nose. In 26 cases (62 per cent) there was a solitary lesion involving the nose and upper lip or adjacent cheek areas. In 32 cases (76 per cent) the skin lesions were restricted to the face. In the remaining 10 cases (24 per cent) there were other active syphilids elsewhere on the body surface.

All of these tertiary lesions involving the skin of the nose were nodular or nodulo-ulcerative in character. In a few instances the nodules were superficial and there was a scale present, but in the large majority of patients the process was hypertropic in type. This was especially true about the external nares, where the proliferative growth frequently completely occluded the openings. An actual tumorous mass was frequently produced in this area. Many of the lesions had sero-sanguineous crusts, the removal of which produced bleeding. The nodules at the periphery usually gave the lesions an irregular outline, as though formed by the arcs of small circles. However, the outline was usually not so strikingly serpigenous in character as that seen in tertiary syphilids of the smooth skin.

The chronic inflammatory process gave these lesions a dull erythematous color, which usually had a blue or violet hue. On palpation the areas involved were found to be indurated and of a firm rubbery consistency. All were relatively painless, both subjectively and to manipulation. The lesion sometimes involved only one side of the nose or was predominantly on one side, but in about 50 per cent of the cases it was strikingly symmetrical.

In some cases there was rapid destruction of nasal tissue. In addition to the damage to the

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*From the Department of Dermatology and Syphilology, University of Michigan School of Medicine, service of Dr. Udo J. Wile.

skin and subcutaneous tissue which resulted in some permanent scarring in all cases, there was an actual destruction of the cartilages of the tip or alae of the nose in 9 cases (21 per cent). This of course produced actual disfigurement. The septum was found to be damaged in 31 per cent of the cases. There was a simple perforation in 5 instances, and destruction of the septum, together with that of the nasal bones, occurred in 8 cases, with resulting deformity of the bridge of the nose.

In addition to the lesions of the nose and skin there were other manifestations of syphilis present in 65 per cent of the cases. There was an active involvement of the tongue, palate or pharynx in 10 cases. The larynx was involved in three instances; one of these also had an extensive syphilitic tracheitis which necessitated bronchoscopy in order to remove large obstruction crusts. Seven cases presented clinical evidence of cardiovascular syphilis and four had syphilitic bone involvement other than that of the nose.

Thirteen patients, or 31 per cent of the total series, showed evidence of central nervous system involvement, as demonstrated either by abnormal spinal fluid findings or by definite neurologic signs. Spinal fluid examination was made in only 29 cases; if it could have been done in all cases it is very probable that the incidence of central nervous system involvement would have been found to be still higher.

The serologic Kahn test* was positive in all but one case. This single exception was that of a 66-year-old woman, who had acquired her infection 40 years previously. Her nose lesion had been present for about 10 years and showed very

*Performed in the laboratories of Dr. Ruben L. Kahn, University of Michigan Hospital.

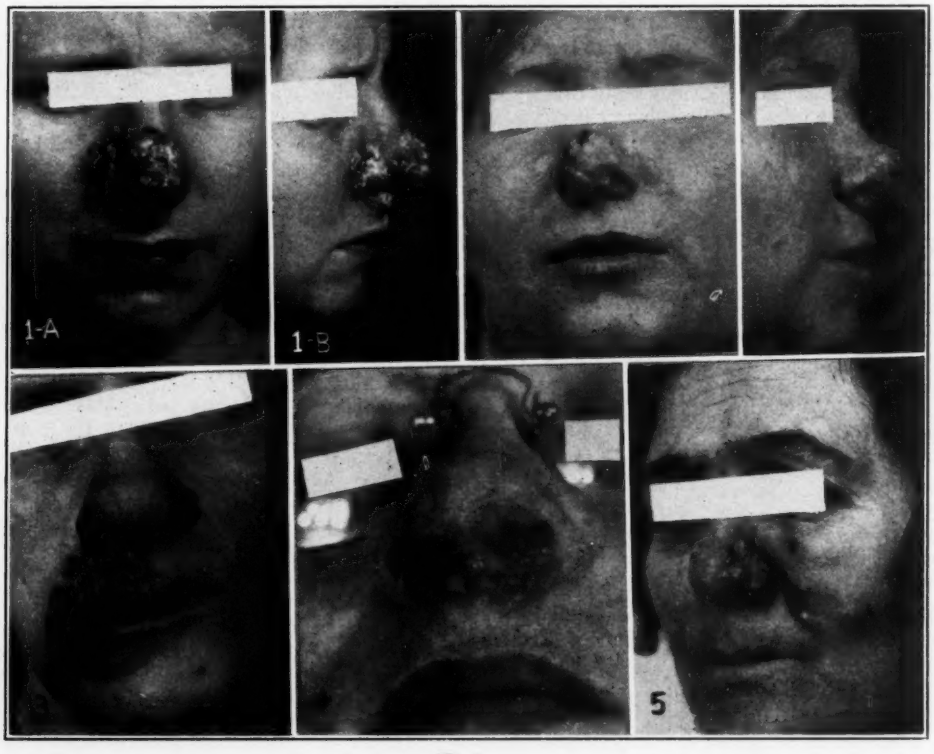

Fig. 1

Gummas of the nose. Case 1: Aged 26. Duration of nose lesion six months. Case 2: Aged 33. Duration five months. Case 3: Aged 37. Duration four months. Case 4: Aged 29. Duration eight months. Case 5: Aged 54. Duration nine months.

little evidence of activity at the time of examination.

Differential Diagnosis.—The differential diagnosis of a nose lesion of this type is always interesting and is sometimes rather difficult. A wide clinical experience is required in order to make the investigation of the individual case as pointed and brief as possible and yet arrive at the correct diagnosis. The conditions which most frequently must be considered are the following:

(1) Tuberculosis cutis
  (a) Lupus vulgaris
  (b) Tuberculosis cutis orificialis
(2) Epithelioma
(3) Acne rosacea and rhinophyma
(4) Rosacea-like tuberculid
  Lupus erythematosus
  Sarcoid
(5) Infectious eczematoid dermatitis
(6) Other possibilities include:
  (a) Impetigo with marked crusting
  (b) Ringworm
  (c) Bromoderma and ioderma
  (d) Blastomycosis
  (e) Actinomycosis
  (f) Leprosy
  (g) Rhinoscleroma
  (h) Glanders

To distinguish syphilis from tuberculosis in this area is frequently not an easy matter. Six cases of this series came to the hospital with the tentative diagnosis of tuberculosis. Another had been admitted to a tuberculosis sanitarium, where it was recognized that her accompanying dyspnea was not pulmonary in origin but cardiac, and a positive serologic test had indicated the correct etiology. Several patients were found to have a syphilitic laryngitis which had previously

Fig. 2

Gummas of the nose. Case 6: Aged 36. Duration of nose lesion eight months. Case 7: Aged 45. Duration one year. Case 8: Aged 28. Duration one year. Case 9: Aged 30. Duration one month. Case 10: Aged 42. Duration three years. Case 11: Aged 66. Duration one year.

been considered to be tuberculous in nature. A number of the patients had recently lost from 20 to 50 pounds in weight.

There are several clinical points of value in differentiating the nose lesions produced by the two conditions. First, the duration of the lesion and especially the rate of increase in size is important. Lupus vulgaris usually begins in childhood and increases very slowly over a period of many years to attain the size which a syphilitic lesion will reach in a period of several months. Secondly, lupus vulgaris usually presents typical light brown colored "apple jelly" nodules at the periphery which can be readily identified with diascopic examination. Thirdly, the lesions of tuberculosis tend to heal with a markedly contractile scar which is very deforming; whereas the scar of syphilis is usually soft and, if the cartilages of the nose have not been damaged, produces little deformity. In cases of tuberculosis cutis orificialis active pulmonary lesions are usually present with a positive sputum. A biopsy is helpful, but it must be remembered that even with the aid of a biopsy it is sometimes almost impossible to distinguish syphilis from tuberculosis. In these unusual cases a therapeutic test with antisyphilitic drugs is of value.

It is a serious mistake to treat a syphilitic nose lesion as cancer. Four of the cases in this series had previously been diagnosed as carcinoma, and one had been treated with radium. Valuable time may also be lost if an epithelioma is treated for syphilis. This mistake is especially apt to occur if the patient has a positive serologic test. The question of malignancy can best be settled by taking a small biopsy. The possibility of carcinoma's being superimposed in an old syphilitic process may arise. This was not encountered in this series and is rare in skin gummas, although it frequently occurs in certain other locations, especially in the tongue.

Acne rosacea and rhinophyma may resemble late syphilids of the nose. However, acne rosacea usually produces a typical erythema of the forehead, cheeks and chin and the accompanying dilated follicles and pustules are characteristic. Infectious eczematoid dermatitis of the nose and upper lip, secondary to a chronic irritating nasal discharge, may at times be confusing; but this is usually not indurated and lacks the circumscribed border of a late syphilid.

In ringworm infections the characteristic spores or mycelia can usually be demonstrated. The diagnosis of bromoderma or ioderma can be confirmed by appropriate urine tests. All of the chronic infectious granulomas should be considered and can be eliminated by appropriate microscopic examinations.

Treatment.—The final cosmetic result obtained in these cases was surprisingly good. The lesions rapidly involuted with therapy consisting of courses of arsphenamine, neoarsphenamine or mapharsen together with bismuth and potassium iodide. A residual erythema persisted for a few months, but when this disappeared there was only a soft non-contractile scar in the large majority of cases and frequently this was almost imperceptible. However, in those cases in which there had occurred destruction of the cartilages or small bones of the nose, the resulting defect was of course permanent.

In outlining treatment for these patients it should be constantly kept in mind that they have a late manifestation of a systemic disease and that visceral syphilitic lesions are also frequently present. Before starting specific therapy each patient should be examined completely, especially in regard to his cardiovascular, hepatic and central nervous systems, and the treatment of each case should be individualized accordingly. This is necessary in order to avoid the therapeutic paradox of curing the nose lesion, but having the patient die of hepatic or cardiovascular complications precipitated by the therapy. If either of these organs shows evidence of involvement, it is wise to begin treatment with only potassium iodide and bismuth for a period of three to six months before using an arsenical. If the larynx is involved, treatment must be started very cautiously in order to avoid a local Herxheimer reaction in that region, which might produce obstruction and even necessitate an emergency tracheotomy.

COMMENT

In studying this series of patients for a possible cause of the syphilitic processes having localized at the nose, it was noted that several patients stated definitely that the lesion had started as a "cold sore." Several others stated that the nose had continued to be sore since an attack of cold in the head. Nine patients gave a history of long-standing nasal discharge and were found to have a chronic sinus infection.

Chronic trauma and nonspecific inflammation are known to be important factors in the localization of a gummatous process in syphilitic individuals and animals.* It therefore seems probable that the trauma and inflammation of

*Chesney, Alan M.; Turner, Thomas B.; and Halley, Chas. R. L.: Studies in Experimental Syphilis. VIII. On the Localization of Syphilitic Lesions in Inflamed Areas. Bull. Johns Hopk. Hosp., **93**:319, 1928.

the nose incident to acute and chronic infections of the nose and upper respiratory tract were responsible for the syphilitic processes localizing on the nose in a significant number of the patients of this series.

SUMMARY

(1) A series of 42 cases of late syphilids of the nose was studied.

(2) There were 40 cases of acquired syphilis and only 2 of congenital infection.

(3) There were 31 women and only 11 men in the series, a ratio of almost 3:1.

(4) The clinical picture was described and the differential diagnosis discussed.

(5) Early recognition of the true nature of the process is important in order to avoid destruction of nasal tissue with its resulting permanent disfigurement.

(6) Local trauma and inflammation, especially that incident to upper respiratory infections, seemed to be an important factor in the localization of the syphilitic process in a significant number of the cases studied.

(7) Sixty-five per cent of the series were found to have other manifestations of syphilis. Sixteen per cent were found to have cardiovascular syphilis; 31 per cent had definite evidence of central nervous system involvement.

(8) With proper and thorough antisyphilitic therapy the cosmetic results were surprisingly good.

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VASCULAR BIRTHMARKS*

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This paper is based on the study and treatment of 107 cases of vascular angiomas seen by me over a period of eight years.

The most frequent location for vascular angiomas as revealed in this study is the head. In this series of 107 cases the lesions were distributed as follows: head, neck and face, 53 per cent; trunk, 23 per cent; extremities, 21 per cent; tongue, 1.8 per cent. Twenty-two patients presented multiple angiomas and ulceration was present in 23 per cent of the cases. More than half of the angiomas were present at birth. Twenty-eight appeared during the first year and twenty-six after the first year.

In this series 92 of the angiomas were in the white race and 15 in the negro race. Seventy-one were females and thirty-six males.

It is well known that both blood and lymph vessels are subject to neoplastic growth, forming two classes of tumors, the hemangioma and the lymphangioma.

Stout defines an hemangioma as a tumor composed of endothelial lined tubes embedded in a fibrous tissue stroma which varies greatly in amount and quality. Sometimes the tubes are small, in which case the growth is apt to be called a capillary hemangioma and sometimes some or all of the vascular tubes or cavities are very much dilated, producing the cavernous type.

Vascular nevi are present at or begin shortly after birth, occurring infrequently in the colored race. They may be round or irregular in contour, flat or elevated, single or multiple; they vary in color from a bright red to deep purple. They occur on the face, head, neck, arms, mucous membrane or other parts of the cutaneous envelope. At birth they may be minute and gradually enlarge to a tumor of considerable size.

The public is becoming tumor conscious and demanding that something be done for the baby or child afflicted with an hemangioma.

Very often we see persons in advanced life in whom vascular angiomas have remained exactly in the same condition and of the same size as they were soon after birth. At other times they advance with frightful rapidity, causing horrible disfigurement or give rise to hemorrhage which threatens life. Malignant growths supervening upon vascular angiomas are infrequent, but still of occasional occurrence.

The old belief that they should be let alone, that ulceration, trauma, inflammation or thrombosis will frequently bring about a spontaneous regression is not warranted in the light of present day management of hemangiomas. While it is true that spontaneous regression may occur, it is unlikely, and when it does happen the results are not comparable to those obtained with radium.

There should be no delay in instituting treatment for either type of hemangioma. The earlier the case is seen and treatment begun the bet-

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*Read in Section on Radiology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

†Former Director, Tumor Clinic, Shreveport Charity Hospital.

ter will be the results. Angiomas of long standing in older children will not respond to radium treatment as easily as when the baby is treated early. Furthermore, delays frequently mean an increase in the size of the hemangioma, with ulceration and resulting scarring.

A modification of the classification of vascular nevi by Wickham and Degras is a workable one:

(1) Flat, superficial nevi, level with the skin, which can be made to disappear on pressure.
  (a) Nevus vinosus, or port wine mark, most often observed on the face.
  (b) Nevus araneous, or spider nevus, which assumes a form somewhat resembling a spider web.
(2) Flat, deeply infiltrating vascular nevi, level with the skin, that usually cannot be made to disappear on pressure.
(3) Raised, soft, vascular nevi. These tumors are the cavernous angiomas and are sometimes pulsatile and erectile.
  (a) Those covered with normal or white skin through which the purplish color of the tumor is visible.
  (b) Lesions deep purple or blue in color with either a smooth or papillomatous covering.
  (c) The fiery red or strawberry colored mark.
(4) Deep subcutaneous and submucous hemangiomas.
(5) Hemangioma hypertrophicum, a bulky cellular tumor.

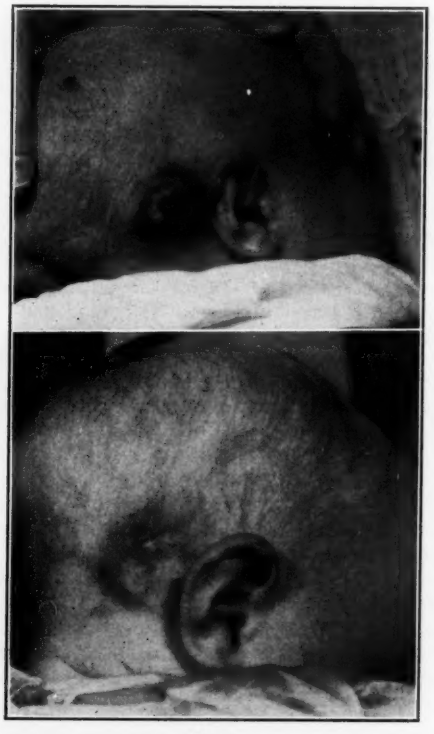

Fig. 1
Ulcerated cavernous hemangioma of scalp. Above, before; and below, after interstitial radium treatment. Slight scarring is the result of ulceration and infection.

The pathologic anatomy of hemangiomas and lymphangiomas will not be reviewed nor the various theories as to their histogenesis. I accept the belief of Ewing:

"The congenital origin of the great majority of angiomas speaks strongly in favor of tissue predisposition as a prominent factor in their genesis."

RADIUM TREATMENT

Stewart says that the various types of hemangiomas differ in response to radiation. The simple spider hemangioma yields to a very small amount of beta radium treatment. The simple port wine type of angioma will blanch with proper radium dosage, especially in very young subjects, but gradually becomes more radioresistant as age increases. Hemangioma hypertrophicum, usually a bulky and exuberant tumor, is only moderately radiosensitive. The bulky, deep or cavernous hemangiomas are relatively resistant tumors. They do not do well with surface radiation and respond satisfactorily only when treated by interstitial radium needles, yielding by thrombosis and local sclerosis, a gradual reduction of the circulation and not a true radiosensitivity. The lymphangiomas are known to be highly radioresistant, following the well-known resistance of lymphatics to radiation. Their response to radium treatment in needle form is like that of the cavernous hemangioma, due to sclerosis and thrombosis.

It seems to be generally conceded that radium is the method of choice in the treatment of hemangiomas, but the type of application appears at great variance with different operators. Surface or contact application seems to be the method most often used, the amount of radium and the filtration varying. A brief perusal of the American literature reveals the fact that the interstitial use of radium has been practiced by only a few.

A study of many of these cases will at once account for the unpopularity of the interstitial plan. Heavy radium needles of the old type and very heavy dosage unquestionably prevented good results and discouraged its use. I doubt that anyone skilled in radium therapy would today use 100 mg. of radium for twelve hours

in any hemangioma. Interstitial radium therapy in any condition has become popular only since low content needles have been available.

Radium is unique in the fact that it exerts a marked action on blood vessels of the hemangioma, other tissues being only slightly or not at all injured. The painlessness of radium is one of its points of superiority over other methods. If the method of application is correct, there is very little scar tissue following the use of radium. Contracture never occurs. Radium treatment acts chiefly on the endothelium of the veins and arteries in the hemangioma, producing an endarteritis with disappearance of the elastic layers in the arteries and marked increase in fibrous tissue beneath the endothelial layer, gradually bringing about a fibrosis throughout with shrinkage.

Kaplan advances a sound reasoning for the use of radium in the treatment of hemangiomas, saying that the aim is to:

"(1) destroy pathological tissue without injury to the normal surrounding or overhanging epithelium; (2) allow the surface epithelium to return to normal after irradiation; and (3) stimulate the normal process of repair so that the pathological tissues may be replaced by wholesome scar tissue."

Surely the use of radium, low filtration, comes nearer fulfilling this aim than any other form of treatment.

Fig. 2

Hemangioma hypertrophicum of the scalp. Above, before; and below, after treatment with endotherm. Radium could not give this quick result.

Fig. 3

Large hemangioma of scalp. Above, before; and below, after surgical removal, showing excellent cosmetic results. No other form of treatment could give such good results.

The vascular birthmarks classed in Group 1 and 2 being of the flat variety, are best treated with surface application of beta radium rays. With the exception of the port wine type they yield quite satisfactorily to one or two applications of radium. The results are not always entirely satisfactory with the port wine type because of the pigment present in the angioma. The writer uses a tray containing 60 mg. of radium in monel needles distributed over 2 cm. square, the filtration being 0.25 mm. The needles are approximately 1 mm. distant to the skin; each 2 cm. square of tissue is so treated that there is no overlap. Sheet lead is carefully fitted about the angioma so as to protect the adjacent normal skin. The duration of treatment is 15 mg. hours; with this dosage a mild erythema occurs. If heavier filtration is em-

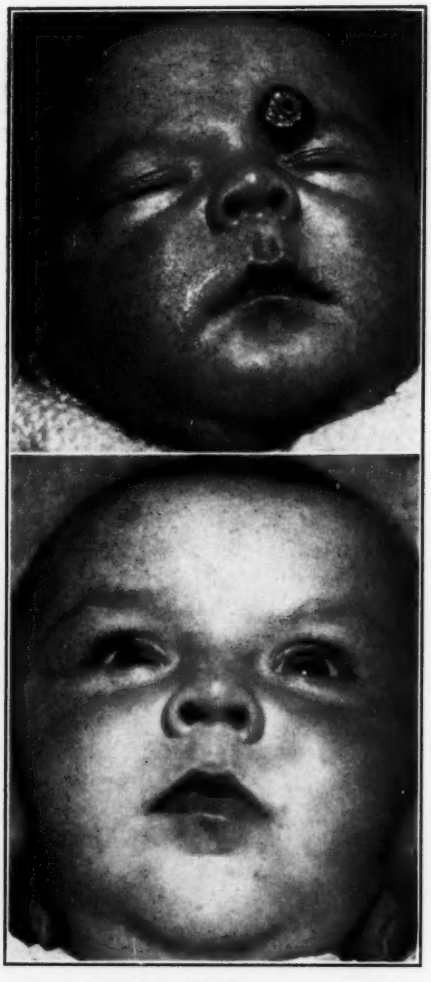

Fig. 4
Ulcerated hemangioma of forehead. Above, before; and below, after a single treatment with surface application of radium. No radium injuries.

Fig. 5
Cavernous hemangioma of upper lip. Above, before; and below, after interstitial radium treatment, supplemented with injection of sodium morrhuate. Slight scarring will improve with age.

ployed 1 mm. platinum is used and the distance increased to 15 mm. With this filtration the dose is increased to 200 milligram hours. A severe reaction is to be avoided, since a break in the skin frequently leads to ulceration and scarring. If ulceration is present before the beginning of the radium treatment it presents no contraindication and the sooner treatment is started the less the scarring will be. Sometimes it becomes necessary to repeat the radium treatments; this is preferable to heavy dosage, which results in scarring and atrophy of the skin. Usually three or four months are required for full results from radium treatments, and this interval should elapse if retreatments are done.

I began to use low radium content monel metal needles in the treatment of cavernous hemangiomas early in 1932, having available ten 1 mg. radium needles, total length 27 mm., active length 16 mm., wall filtration 0.3 mm. monel. The fear of hemorrhage, infection and other complications following interstitial low content radium needles is without foundation. Radium therapy is now on a surgical basis and should be carried out with meticulous care like any other surgical procedure. A general anesthetic is rarely necessary. Morphine sulphate in doses of 1/64 grain to each ten pounds of body weight one hour before operation will produce sufficient narcosis, with the aid of a little local anesthesia at the needle puncture site, to permit insertion of the needles without difficulty. The needles are usually placed from 1.5 to 2 cm. apart; oc-

Fig. 6
Hemangioma of forearm. Above, before; and below, after surface radium treatment. No other form of treatment could give better results. No radium sequelae.

Fig. 7
Ulcerated hemangioma of leg. Above, before; and below, after single surface application of radium. Slight scarring due to ulceration and infection.

casionally when the hemangioma is very large, because of necessity, the needles are placed at greater distances. When the angioma is small the needles are placed spoke-fashion. The needle is not completely buried as is done with the other type of radium needles, but inserted as far as the eye and the threads are cross-tied to hold the needles in place. My reason for not burying the needles is that their removal is much easier and more painless by this method. The needles are left *in situ* from twenty-four to forty-eight and in some cases seventy-two hours. Following the removal of the needles a weak alcohol dressing is applied, the field redressed on the second day and the patient is permitted to return home, with instructions to remove the dressing in four or five days and apply only plain vaseline dressings, should a skin reaction occur. With twenty-four-hour applications noticeable skin changes rarely occur. When large angiomas are treated and longer applications made a mild erythema may occur. The avoidance of skin changes is the ideal goal. The patient returns for examination three months after treatment and nearly always there are good cosmetic results with apparent disappearance of the angioma. An additional treatment is rarely done. Interstitial radium has been employed in thirteen cases.

Several months ago I secured some of the small radium element implants which were designed by Pack. These implants contain 1.3 mg. radium and have a wall thickness of 0.3 mm. platinum, length 7.5 mm., being only a fraction larger than the removable radon implant. The growing popularity of these implants in the treatment of malignant tumors prompted me to extend their use to small cavernous hemangiomas, in the treatment of which I found them excellent. They are left *in situ* usually two or three days and, of course, are completely buried.

SCLEROSING AGENTS

Treatment of vascular angiomas by the injection of sclerosing agents has been in use more than three-quarters of a century. John Eric Erichsen, writing in his work, "Science and Art of Surgery," 1868, describes his method of injection of perchloride of iron, and points to the danger of slough or fatal embolism. Since that time many sclerosing agents have been employed, such as sodium salicylate, solution of quinine and ethyl carbonate (urethane), chloral hydrate, antipyrine solution, sodium morrhuate, and so on. I have used only sodium morrhuate and believe this to be the most satisfactory drug available. The usual sterile precautions are taken. A luer-lock syringe of 2 c. c. capacity and a 25-gauge needle are used. The needle is introduced at the border of the lesion into the base and the solution slowly injected as the needle is withdrawn. The amount of solution injected should be minimal, usually 0.5 to 1 c. c. A larger quantity may produce a bad slough. Bleeding from the needle puncture is not troublesome. Injections should not be made oftener than once every two weeks or more. Occasionally, after the injection the angioma may become swollen and tender. The secret of success is small repeated injections to avoid scarring. I have observed severe sloughing in one case. The use of sodium morrhuate, as an adjunct to radium, has been employed in eighteen cases.

REFRIGERATION

Congelation is an old method of treating tumor growths. Velpeau made use of it in 1853 and its value has been long established. Modern refrigeration therapy in vascular angiomas is accomplished by the use of dry ice and has become unduly popular largely because of its simplicity and ease of application. Over-treatment will frequently produce a slough. The dry ice should be cut the exact size and shape of the lesion to be treated and the application should not exceed seven or eight seconds if ulceration or slough is to be avoided. Refrigeration therapy is especially applicable in the capillary variety of angioma less than 1 cm. in size as an adjunct to radium for "mopping up" patchy areas of the angioma at the periphery and where irradiation is impossible or contraindicated. Success is again accomplished by not hurrying the treatment. Intervals of one or two months are advised. Refrigeration has been used in twelve cases.

SURGERY

Surgical excision of vascular angiomas is one of the oldest forms of treatment. Nowadays it is rarely used. In this series surgical excision of the angioma has been performed in three cases.

ROENTGEN RAY TREATMENT

Roentgen ray treatment of angiomas is recognized. The biological activity of radium and roentgen rays in comparable doses produces practically identical biological changes. Roentgen ray treatments offer no advantages. The ease with which a radium tray is applied to the angioma as compared to the difficulty of the roentgen ray treatment of a bawling, squirming 6-

months-old baby needs no further elucidation. No vascular birthmark in my series has been treated with roentgen rays.

CONCLUSION

Radium is the treatment of choice. Careful dosage, repeated at long intervals if necessary, will avoid scarring and late sequelae and gives the best end results in a large majority of cases. The cost of treatment is much less than with other types of treatment, which require repeated applications.

Dry ice is valuable for the small hemangioma or around the periphery of angiomas previously irradiated.

Of sclerosing agents, sodium morrhuate is especially valuable for use in areas where radium is contraindicated.

No single plan of therapy will give good results in all cases.

No form of treatment should be pushed too rapidly.

Suite 212 Medical Arts Building

DISCUSSION (*Abstract*)

Dr. J. Cash King, Memphis, Tenn.—There are many reasons to recommend early treatment of vascular birthmarks. These lesions respond more rapidly to radiation therapy, and the total area treated is usually much less if the child is treated soon after birth, certainly before 6 months of age. Of course, ulceration is seldom encountered if the child is treated extremely early in life.

There is another point worthy of mention among the indications for early treatment. The removal of these lesions, regardless of how little disfigurement they produce, lessens materially the anxiety of the parents and removes one of the ever-growing nervous strains placed upon the mothers of today.

The use of a sclerosing agent and interstitial radium in the cavernous types of hemangioma and certain of the lymphatic angiomas is admitted and endorsed one hundred per cent as Dr. Edwards has presented it.

As the doctor stated, the effect of roentgen irradiation upon these lesions is quite similar to that of radium irradiation, and it is my opinion that a paper presented to this Association and published in the SOUTHERN MEDICAL JOURNAL must not fail to emphasize the importance of the personal element entering into the treatment. In other words, if the vicinity in which a child is to be treated has available a competent roentgen therapist and a less competent radium therapist, the child will profit materially by being referred for roentgen therapy.

As for the cases coming to receive treatment which are already in ulceration, we have found it extremely effective to give a very small dose of roentgen therapy as a treatment for the inflammation only. Usually 125 roentgens of soft irradiation will permit a clearing of the infection and a healing of the surface epithelium over the lesion within five to ten days. After this the attack of the actual vascular birthmark can be carried out with the dose of irradiation required.

I want to emphasize again what Dr. Edwards has said, that small amounts of irradiation only are required in these cases. Certainly the rapid-growing, semi-embryonic tissues of these children are radiosensitive, and arrested growth of deeper structures with permanent disfigurement may occur from an overdose of irradiation, and both radium and roentgen therapy must be employed cautiously and with ample waiting period for the results to occur before repetition of the dose.

It requires as much or more skill to apply effectively the small doses of radiation which are required in these cases than it does to apply the massive dose of radiation in malignant diseases.

Since it is always advisable that we use a very soft type of radiation, that is, radium with low filtration or roentgen therapy generally of a low voltage, it seems probable that the newer form of contact therapy may be extremely valuable in attacking these lesions, particularly the small ones.

In treating the children who are not old enough to cooperate, we have found it very effective to give them small doses of pentobarbital sodium or a similar sedative by mouth, in the bottle with the formula, or with a soft drink or fruit juices in larger children. Within thirty minutes or less time they sleep very soundly through the treatment, which permits a very accurate arrangement of the field, so that we get accurate distribution.

It would also seem advisable to use roentgen therapy where we have extremely large fields involved, such as a greater portion of one extremity or the napkin distribution of the trunk because we get a more uniform distribution of radiation. Also I think it is possible to deliver less irradiation to the deeper structures by utilizing the soft roentgen ray rather than radium therapy. Certainly I believe that through the section that receives the SOUTHERN MEDICAL JOURNAL we have more competent men as roentgen therapists than we have who are competent to use radium therapy.

Dr. William E. Eastland, Oklahoma City, Okla.—I have been quite interested in the treatment of vascular nevi and presented a paper on this subject about 1933 in Richmond before this organization.

I also was quite interested in Dr. Edwards' treatment of this condition by interstitial radiation. My experience with this method has been very limited. He pointed out that he thought that he was perhaps getting better results by interstitial radiation than by surface radiation in cavernous hemangiomas. I have used surface radiation on many cases in my service at the University Hospital in Oklahoma City and in private practice and have been very gratified in the response to external radiation.

I believe, as has been pointed out, that it is necessary to pay a great deal of attention to the technical factors in order to obtain a good response; in other words, thorough filtration, by not using less than one mm. of platinum or its equivalent, is necessary plus a distance of approximately 2 cm. This gets away from an erythema of the skin, a thing we wish particularly to

avoid. Correct spacing of treatment intervals by not giving any treatment within a period of less than six weeks is indicated. As time goes on, the interval should be two and three and four months apart, thereby necessarily making the treatment cover quite a period of time up to two years. It is, of course, important to get the mother's cooperation and to inform her of the protracted treatment time at the outset.

One of my colleagues has been somewhat chagrined by some of his friends' saying that the English point out that the treatment of vascular nevi is unnecessary because they spontaneously disappear. The essayist has already shown us pictures and demonstrated that this does not occur, at least not very often, and he has shown us malignant degeneration occurring in these lesions. I constantly see adults with vascular nevi which have persisted throughout life.

I do not treat port wine marks. When a person has a vascular nevus that is absolutely flat, as if so much red ink has been spilled on the skin, it is foolish to treat him because the treatment leaves a somewhat mottled, messed up appearance. It has been done in the past, but I believe most men prefer to leave them alone.

I wish that Dr. Edwards would point out how he handles a vascular nevus of 2 or 3 mm. thickness when it is on the eyelid. I have been very gratified in watching some cases as long as twelve years and more that have been treated that way and have seen no untoward effects occur to the lens.

It has also been interesting to me to note that babies with large cavernous hemangiomas, and especially those which are necrosed, have more or less constitutional weakness. They are very prone to have pneumonia and die, and I have seen quite a number of these. I wish Dr. Edwards would tell us whether he has observed this.

Dr. Edwards (closing).—It is quite true that there are more competent roentgen therapists throughout the Southern states than there are radium therapists. Most of the radium therapists in the South, I think, have reached their knowledge of radium therapy by trial and error rather than on the accurate scientific basis by which it is now possible to learn it. I think also that the bad results one sees in radium therapy of angiomas are due to overdosing and to overenthusiasm on the part of the man treating the case or a lack of knowledge of his dosage, either of which usually results disastrously.

I do not know whether it would be a good idea to pass the word out that birthmarks are easily treated by roentgen therapy or not. In my section of the country I rather think it would be bad because every physician has bought an x-ray machine and everybody is treating anything that comes into the office. I would much rather they would swing to the sclerosing agents or to the refrigeration agents.

Very recently there has appeared in *Surgery, Gynecology and Obstetrics* the summary of a study of some thousand cases of hemangiomas seen at the Memorial Hospital, and this study has revealed many, many bad sequelae. Unquestionably much of this is due to overdosing. Dr. Pack and his associates are much more inclined now to the sclerosing agent, sodium morrhuate, and the use of dry ice than they are to radium therapy, although they are sometimes combining all three of them.

The one thing which will lead to success is to take time, whether it is roentgen therapy or radium therapy, sclerosing or refrigeration. Any attempt to hurry the patient's treatments will not give the best results.

I have shown some cases treated on the eyelid and I think that this is entirely possible if we use beta rays because we have a very short exposure. A tray of 60 mg. of beta radiation for 15 minutes is all that is needed and if necessary we can retract the lid. However, I, too, have now swung to the use of the sclerosing agents in hemangiomas around the eyes.

Insofar as the constitutional weakness of the patients, I have always been impressed by the fact that they are usually very, very fine babies, although it is well known that occasionally when a baby has multiple angiomas there are some cerebral angiomas and it may be well to impress the patient's mother if you are treating about the head that the baby may develop some mental condition. I had a case in which the patient was a mental defective following irradiation treatment.

THE RELATION OF THE HYPOTHALAMUS TO NEUROPSYCHIATRY*

By BEVERLEY R. TUCKER, M.D., F.A.C.P.†
Richmond, Virginia

Introduction.—The present century has brought much knowledge of the function of the gray matter of the brain. In its early years it was determined that the chief centers of sensation were posterior rather than anterior to the fissure of Rolando; around 1906 Marie's discussion relating to the speech centers and the mechanism of aphasia swept the neurologic world; the prefrontal areas as psychic intellectual centers were further identified; the temporo-angular gyral region for word hearing, word seeing, word reading, and word writing was diagrammed; the refinements of cerebellar functions ran apace; later the cause of Parkinsonism and paralysis agitans was located in the basal ganglia by Stanley Cobb's experiments on monkeys, and Wilson's disease was described and attributed to basal ganglia origin. Recently Cannon, Bard, Fulton, Ranson and others too numerous to name stirred up so much interest in the hypothalamic area that the whole of the last meeting of the Association for Research in

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†Chief of Staff, Tucker Hospital.

Nervous and Mental Disease was devoted to the consideration of this region.

History.—Rokitansky, in 1842, described hypothalamic lesions as associated with visceral disturbance and another Viennese, Mauthner, in 1890, attributed the somnolence of encephalitis to involvement of this area. For some years disturbances of the basal ganglia, the pituitary bodies, and the hypothalamus were greatly confused.

In discussing the functions of the hypothalamus and its sympathetic and parasympathetic connections, I[1] gave reference to some of the historic literature of this development in a recent paper entitled "Emotional Illness." To make the development more complete I shall mention some of the lately published findings of the Research Association[2] mentioned. In the relationship of carbohydrate metabolism to the hypothalamus, C. N. H. Long concludes:

"A predominant role of this region in this phase of general metabolism has not yet been proved."

Gildea and Mann felt that lesions of the tuber cinereum and the hypothalamic areas not involving the pituitary may produce either obesity or emaciation in animals, but the mechanism is not yet understood. Donald Sheehan said:

"There is strong support for the existence of a sympathetic center regulating the gastro-intestinal activity located in the hypothalamus, more particularly the lateral hypothalamic area."

Frank Harrison concludes that excessive sleep results from depression and frequently insomnia from the increased activity of the hypothalamus by experiments with mechanical, electrical or chemical agents. Joseph C. Hinsey's experiments with hypothalamic stimulation gave

"in addition to visceral responses, somatic movements involving the head, trunk and extremities."

L. O. Morgan, discussing cell changes of the hypothalamus in the major psychoses, says that hyperexcitability of hypothalamic nuclei probably results in hyperexcitability in the psychic areas of the brain and that hypo-activity of these centers would probably favor a condition of apathy or dullness and that beyond this the pattern of a psychosis is probably not determined by pathologic changes in the hypothalamus. Norman Dott, quoted by Foster Kennedy, says that the hypothalamus contains the mechanisms of the more primitive psychic and emotional reactions; that it is concerned with reactions of defense, aggression, suspicion, fear, anger and sex; that if released from control of the better educated frontal cortex it ignores the refinements of decency and convention. Kennedy himself feels that the mamillary areas are concerned with sleep. He also says that the hypothalamus is the neuroglandular instrument in command of vital rhythm and is concerned with such rhythms as breathing, the consistency of pulse rate, the cycle of sleep, the integrity of body weight, and the periodicity of menstruation. He feels that the fluctuations of moods and behavior and the rises and falls of emotional expression should be further looked into.

Discussion.—Indeed many functions have been attributed to the hypothalamus, but we should go carefully, for it has not been proven that it contains vomiting centers, respiratory centers, or cardiac centers. We will sin less by errors of understatement than by those of overstatement. It is supposed, however, to contain centers for sleep, heat regulation, and water metabolism. It has been contended by some that the hypothalamic gray matter is not the seat of the emotions, but evidence is overwhelmingly in the affirmative.

My particular interest in the hypothalamus was first stimulated by the preparation of a paper on the emotion-reason balance published in 1938 in the *Virginia Medical Monthly* and furthered by the paper already mentioned on emotional illness. Recently the Nemours Foundation, formed under the will of the late Alfred I. duPont, gave a research fellowship to Dr. Harry Brick to study the relation of the hypothalamus to clinical emotional expression. This work is being undertaken in connection with the Medical College of Virginia under my general suggestion. It is gratifying to feel that the South is being granted more opportunities in the research field.

There are many questions regarding the hypothalamic gray matter which are in dispute and while one may have and state one's ideas, I feel that it is wise to keep an open mind until various questions are more definitely settled.

One question is whether the gray areas of the hypothalamus were originally cut off from the cortex in the invagination of the brain into the skull or whether they were placed in this protected location because of their importance. I am inclined to the latter view because although some cells resemble motor cells, most of the cells are morphologically quite different. Also most authorities think that phylogenetically the hypothalamus is more ancient than the cortex.

Another question which arises is whether the pituitary bodies, the anterior lobe, the posterior

lobe, or both, should be included in the hypothalamus. In spite of the fact that there is a connection between the infundibulum and the tuber cinereum, I prefer to consider the pituitary as belonging strictly to the endocrine system.

There seems no doubt of the vegetative supply to the hypothalamus connecting it to various parts of the central nervous system, to the viscera, and to other parts of the body, or, of the fact that it is supplied with inhibitory and pressor connections.

Description.—For practical purposes the hypothalamus of the diencephalon may be said to consist of genetic growths of gray matter embryologically placed in this protected part of the brain and to contain the following nuclei or centers: the corpus Luys, the substantia nigra, the substantia rubra, the mammillary bodies, the tuber cinereum, and those nuclei situated near the optic chiasm.

The cells of the hypothalamus, many of them containing several nuclei, in man and other animals, vary so much in size, shape and various characteristics that they have been termed by some neuropathologists, pseudopathologic cells. Certain transitional cells closely resembling motor cells have been described by Edward Malone.* However, so far as I know, neither Purkinje nor Betz cells have been found in the hypothalamus. Some of the cells are secretory in the neuron secretory sense. It would appear that besides vegetative fibers there are neuronic fibers connecting with other gray matter cells. These neuronic fibers may be myelinated or non-myelinated, but as yet a diagrammatic skeleton of them has not been mapped. However, there seems to be abundant evidence, some of which I quoted in the paper already mentioned ("Emotional Illness"), that there exist connections, through the sympathetic and parasympathetic systems, which may justify our classification of some of the hypothalamic gray matter as vegetative centers. Much further neuro-anatomical study of this whole subject is still desirable.

*Motor cells in the nucleus intercalatus corporis mamillaris and in the substantia reticularis hypothalami.

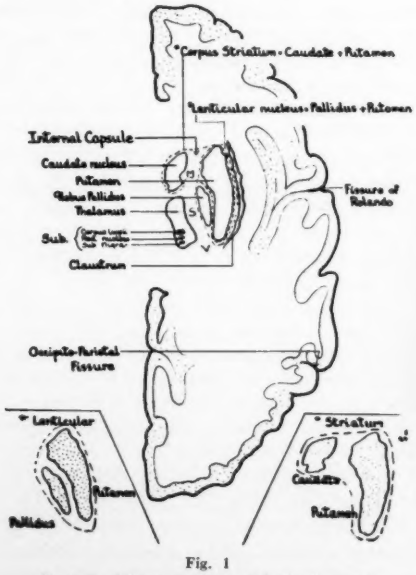

Fig. 1
Diagram of basal ganglia and internal capsule.

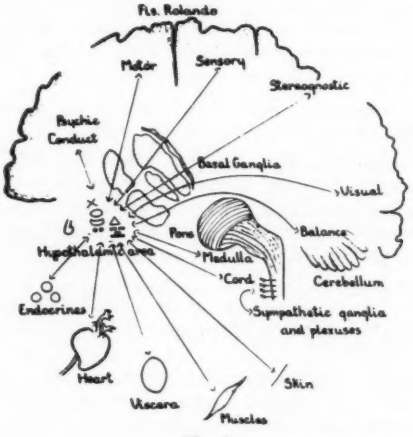

Fig. 2
Schematic idea of emotional centers and pathways—B.R.T.[1] Modified from standard diagrams. (Arrows indicate afferent and efferent sympathetic and parasympathetic fibers.)

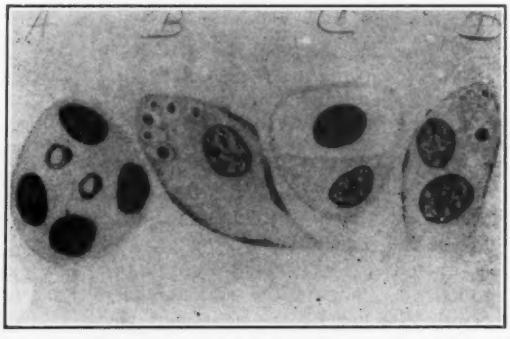

Fig. 3
Paraventricular and supraoptic nuclei cells showing granules and droplets inclusions. These are multinuclear cells supposed by some to be neurosecretory (Scharrer,[2], p. 17, plate 1).

As nontechnically as I may, I wish to direct your attention in this paper to some of the organic and functional disturbances of the hypothalamus.

Organic Disturbance.—By organic disturbance of the hypothalamus is meant those chemical, infective, or mechanical conditions which give demonstrable pathologic lesions in these nuclei. Something has been learned by observations which have been made in cases of carbon monoxide poison giving somnolence followed by memory lapses and emotional anxiety states.

The study of purulent and virus encephalitis has added to our knowledge of the hypothalamus. The hypothalamus is affected in practically all cases of encephalitis and somnolence or wakefulness may ensue as may lethargy or excitability. In the Parkinsonian cases, tremors and emotional states may be connected with invasion of the thalamus and other basal ganglia and of the hypothalamus as well.

Tumors of the brain, cerebral hemorrhage and brain trauma injury to the hypothalamus give many emotional and other hypothalamic symptoms. Tumor of the third ventricle may give somnolence, polyuria, and disturbance of temperature, blood sugar level, fat distribution, water balance, and possibly of sex organ development. Most of these are hypothalamic reactions. Not enough tumors of this region have been reported to form the clinical picture into an entity. The hypothalamus is highly vascularized and hence hemorrhage may take place.

In residual symptoms from head injuries, whether or not of medicolegal import, injury to the hypothalamus must be carefully considered

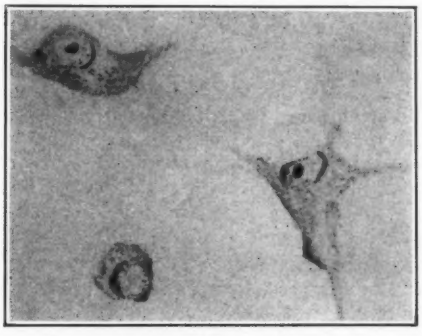

Fig. 4
Medial ganglion of mammillary body. Fusiform, polygonal including granules (Malone[3]).

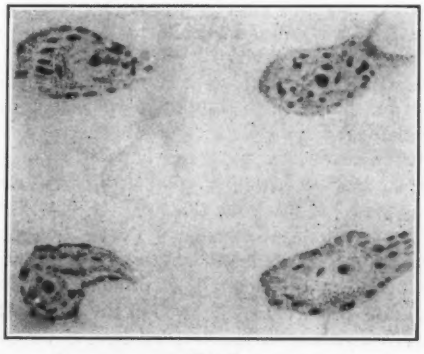

Fig. 5
Intercalate nucleus of mammillary body. Polygonal including Schollen spindle flakes (Malone[3]).

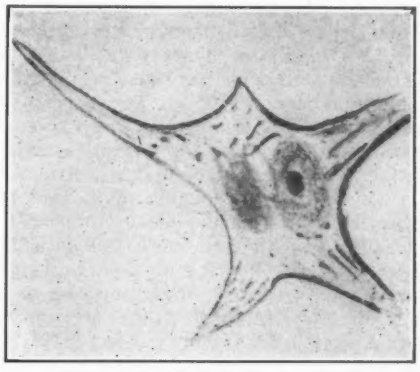

Fig. 6
Motor-like cell of substantia reticularis includes flakes and pigmented area (Malone[3]).

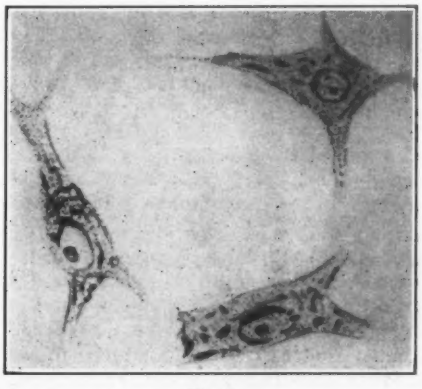

Fig. 7
Other cells of reticular substance including flakes and oval nuclei (Malone[3]).

and separated from compensation complex, pseudo-malingering and genuine malingering.

Toxic states may affect hypothalamic functions and at times are exceedingly difficult of differentiation from the so-called functional disturbance. The wisest course to pursue is to consider toxic states with hypothalamic reactions as due to pathologico-chemical effect and thus classify them as organic, for I feel that brain cell morphology is affected in these states even if only temporarily.

Functional Disturbance, So-Called.—The word "so-called" is used, for who can say that any syndrome or disease is, both primarily and secondarily, truly and wholly functional? Then, too, there are hypothalamic disturbances connected with pathologic states in which the patient has in truth two conditions, organic and functional, independent or inter-dependent. Thus a patient may have a gastric ulcer which was caused by functional hyperexcitability of the hypothalamus through its vegetative gastro-intestinal tract connections; or a patient may have a gastric ulcer of definite local irritative causation which may so upset the patient's emotional vegetative apparatus as to induce a hypothalamic emotional, anxiety reaction. A surgeon may operate upon an actually infected appendix or gallbladder or a diseased ovary and do a most satisfactory piece of work from a surgical standpoint, but the patient may continue his or her distracting complaints without the surgeon's ever recognizing that he has been dealing with two conditions, one a functional hypothalamic disturbance and the other the pathologic lesion of the organ, which he diagnosed and which he confirmed at operation.

And so an internist of good repute may tell a patient who has a diseased organ that he will be entirely well after a certain line of medical treatment is instituted, only to find to his dismay that when all is said and done the patient suffers as before or has added complaints. He may never think of the hypothalamus. These surgical and medical tragedies are, unfortunately, not occasional. They are exceedingly frequent.

The question now arises, is there a definite functional hypothalamic syndrome which the physician may recognize? It would be a rash assertion to say that the symptoms can, in our present state of knowledge, be formed into a real entity, but there are certain conditions which have been classified as neurasthenic, psychasthenic, psychoneurotic, and anxiety states, which I believe are due to hypothalamic emotional disturbance expressed through the feeling-tones and carried to various parts of the body by hypothalamic sympathetic and parasympathetic connections. These disturbances, I predict, will soon be gathered into a syndrome. Considering our cases, and such cases in general, I feel that we may state that symptoms most common to hypothalamic disturbances are fear states, contamination phobias, unusual dreads, anxiety states, emotional explosions and instability, insomnia or drowsiness, apprehensions, guilt and shame reactions, temperamental rises and falls, uncontrolled weeping, ideas of being watched, ideas of suicide, and fear of doing violence to others. These are combined with the vegetative symptoms of visual changes, vertigo, nausea or vomiting, flatulence or constipation, hypo- or hypergastric acidity, excessive perspiration, especially of the hands and feet, shivering sensations and rigors, polyuria, flushing, sensations of heat and cold, and paresthesias. Frequently in hypothalamic conditions there is a change in the pulse rate: fast, slow, or irregular; in the blood pressure, usually low or variable; in the water balance, decrease or increase; in the temperature, above or below the normal line; in oculo-pupillary reactions, and in various secretions. I have found that the blood calcium is usually low. Complaints are frequently heard of pain or discomfort in several or many organs of the body, which are usually excessively or dramatically expressed.

These cases have been given every form of treatment from rest to exercise, from petting to bawling out, from osteopathy to Christian Science, from physiotherapy to psychotherapy, from appendectomy to hysterectomy, and from what are termed "shots" of various medicaments to those of every known derivative of every known ductless gland, all with occasional beneficial results because what the patient has faith in may settle his emotional equilibrium, at least for a while. These measures, to say the least, are poor chance therapy. But even less beneficial than the therapies mentioned has been the profound advice to "snap out of it," to "forget your complaints," to "pep yourself up," to "take a trip," to "adjust your sex life," and if single "to get married," if married "to get a divorce." More harmful still has been the indiscriminate administration of barbitals, of bromides, of opiates, and of alcohol. At about this stage the neuropsychiatrist is honored by having the patient referred to him: penniless, fragile, frustrated, having lost faith in both man and God.

Treatment.—The first thing to do in treating these patients is to separate the patient from his usual environment by proper hospitalization and restriction of visitors and then to establish in the patient not only rapport with the physician, but a genuine confidence in him. A sensible acceptance of explanation and a re-education of the patient's attitude toward life in general not only must be obtained, but also he must be taught how to handle his chief discomforts and complaints. An emotion-reason balance must be struck. In his own particular way each physician of this audience knows better how to accomplish this than I could possibly tell him. I can only advise you, in this hurried world, to take the time and patience necessary.

If the patient is taking harmful sedative drugs, they should be discontinued and for them should be substituted members of the belladonna group, rabellon (belladonna root extract) being probably the best, sodium chloride in certain cases, calcium in certain cases, and other basic salts indicated in restoring the physiologic balance. Sub-shock or shock doses of insulin or metrazol are useful in severe or intractable cases. Electroshock may be used.

Diversional therapy, massage, and tepid bed packs are often helpful.

The prognosis is usually good, or possibly I should say unusually good, if the case is properly handled.

In conclusion I shall state that when all is said it must be recognized that fear is the hull, masts and sails of the functional emotional hypothalamic ship and that the best bit of description of what fear can do is found in "Arcadia," a poem written by Sir Philip Sidney some three hundred and fifty years ago:

Fear is more pain than is the pain it fears,
Disarming human minds of native might;
While each concern an ugly feature bears,
Which were not evil, well weighed in Reason's light.

The hypothalamic area is the Davy Jones's locker in the Sargasso Sea of neuropsychiatry and its exploration will reveal numerous old hulks and much debris, but also many chests of invaluable gold and precious jewels.

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DISCUSSION (*Abstract*)

Dr. Wilmot S. Littlejohn, Birmingham, Ala.—We are gaining more and more specific knowledge of and correlating into some semblance of order rather definite syndromes and functions relating to the hypothalamic area. It would seem that the hypothalamus in man with its relation to his present day environment might be compared to the "timer" of the modern, efficient streamlined automobile. It is apparently the "timer" for the proper coordinated functioning of the neurologic, psychic metabolic and endrocrine systems through and with the autonomic nervous system.

Habit probably plays a large role in lowering or raising the threshold of hypothalamic excitability. By habit is meant emotional habits: those of the patient who through ignorance, carelessness, an improper understanding of his underlying trouble, or the patient with inherent frailties of the nervous or endocrine systems, may cultivate his susceptibility. The threshold of hypothalamic excitability is evidently lowered by frequent unbridled emotional swings. Particularly in the group of patients above named does this fall on fertile soil. Long continued physical or mental effort, particularly to the point of exhaustion, may be the time fuse of these emotional explosions. These patients should be warned to snuff this fuse before it has reached the danger point.

This group will also usually be of the hyper-reactive type. They are hyper-reactive to environment, subjective stimuli, and to physical or objective stimuli. This largely accounts for their acute awareness of their visceral symptoms.

The belladonna group of drugs, as mentioned by the essayist, can be employed as a crutch to tide most of these patients over their crises. In my hands no specific preparation of this group has proven consistently advantageous over other preparations. One patient reacts better to atropine, another to belladonna, another to combinations of belladonna. Pronounced physical or physiologic deficiencies should be alleviated as much as feasible without undue attention's being directed to this.

One of the most important measures, however, is to train the patient in the habit of relaxation. Very happy results often result from the patient's practicing frequent periods of passive relaxation during the day. Several times during the day the patient stops and completely relaxes mentally and physically for three to five minutes. This can be done as well in his office chair as by lying down. For the patient who is ambulatory and still leading an active life the results are most gratifying. But remember no panacea has yet been discovered; each patient will present new problems to tax the ingenuity of the neuropsychiatrist.

As neuropsychiatrist to the Charlanne School, a school for so-called birth-injuries, in Birmingham, Alabama, I probably see more than the average number of cerebral palsies in children. We are of the opinion that a large number of these children show evidence of hypothalamic dysfunction. As you know in addition to the motor disturbances a large percentage of these patients present signs and symptoms of endocrine disturbances, autonomic nervous system disturbances and marked emotional instability. The symptoms are consistent with the recent studies by Alvarez. Most will show abnormal hair growth, tendencies to obesity, or extremes of emaciation in spite of food intake or general health.

They are subject to frequent gastro-intestinal upsets. There is practically always excess salivation and frequently there are abnormalities of sweating. Their thermostatic control is evidently often involved as shown by the abnormal temperature reactions to mild or severe acute illness.

It is probable that some of these patients have lesions of the hypothalamus as well as having hypothalamic disturbances due to cortical cerebral damage and consequent partial loss of the cerebral control of the hypothalamus.

The reports of Finley and Craigie to the Association for Research in Nervous and Mental Disease, December 1939, reviewing the capillary architecture of the hypothalamus should refresh our knowledge that the hypothalamus may be subject to insult by trauma and disease. It is quite probable that more of these so-called birth injuries have direct pathology in this area which could account for many of the bizarre symptoms we find. This is probably why many of these children show symptoms characteristic of senility.

It is interesting to speculate as to what will be the results of the present world war on the people of the belligerents. Whole populations are being subjected day after day to bombardment such as civilians have never undergone before. Hypothalamic insults are being inflicted almost constantly and in wholesale measure. These civilians have to sit quietly and inactively waiting for death and uncertainty. They do not have the relief and outlet of combat and activity which the soldier enjoys. What will be the consequences on them and the generation they bear under the circumstances? One cannot continue to be courageous in the face of continuous fear and danger of instant death. Fear must certainly begin soon to bombard the hypothalamus when the antidote of aggressive activity is denied the victims.

Dr. Foster Kennedy in his presidential address to the American Neurological Association expressed this thought, "The excess of adrenal substance which would armor us for battle, in the absence of battle fills us with fears."

Dr. W. de Gutierrez-Mahoney, Nashville, Tenn.—In my experimental work on animals, including dogs, monkeys, baboons, and chimpanzees, in no instance have I ever found any demonstrable alteration in physiology after the hypothalamus and the pituitary body were separated if there was no damage done to the hypothalamus.

You are all familiar with the almost paradoxical behavior of the hypothalamus which is seen in clinical medicine. Thus, a tumor of the hypothalamus may cause one person to be maniacal, and another to be very docile or even to sleep constantly, although the same anatomical area is involved in each patient. Likewise, obesity has been associated with a hypothalamic tumor in one and emaciation in another, when the patient is eating ravenously. Following operation in this area some patients suffer extreme hyperthermia and others extreme hypothermia.

I have made a comparable observation regarding this paradox while carrying out experiments on this area. Using a litter of puppies, aged six weeks, I applied a silver clip to the pituitary stalk so that the base of the hypothalamus, the tuber cinereum, was involved. The control puppy grew normally. One of the puppies became stunted in growth and emaciated; another puppy, also retarded in growth, became extremely obese, and weighed about twice as much as the other. These phenomena occurred in the presence of an intact pituitary body.

Further evidence of physiologic disturbance following a tuberal lesion was seen in a chimpanzee in which I had done hypophysectomy. Inadvertently I had damaged the tuber cinereum; within twenty-four hours the animal had such extreme gastric diapedesis that it died because of hemorrhage, although at postmortem there was no gross lesion of the stomach to be found.

Finally, with regard to growth and premature puberty, it has frequently been felt, at least it has been promulgated, that pubertas precox is due to a tumor or lesions of the pineal body. I have seen a young lad who at the age of seven years was normal; at seven and a half he had already overgrown his mental and sexual development and activity, and at postmortem the pineal body was absolutely normal in all respects, even by serial section study. The hypothalamus was affected by a tumor, an astrocytoma, which involved the mammillary bodies. It is my feeling that this part of the hypothalamus probably has more to do with the phenomena of growth and sexual maturity than does the pineal.

Dr. Tucker (closing).—I have not proposed to discover a new entity or new disease, but out of the various symptoms mentioned and from a further study of this area I feel confident that there will come a certain syndrome which may be definitely classified by its symptoms and by its pathology.

THE GONADOTROPINS: A CLINICAL AND EXPERIMENTAL STUDY*

WITH OBSERVATIONS ON THE USE OF A NEW GONADOTROPIC MIXTURE AND ON COMBINED EQUINE AND CHORIONIC GONADOTROPIN ADMINISTRATION

By ROBERT B. GREENBLATT, M.D.

and

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Augusta, Georgia

INTRODUCTION

The recent enthusiastic reports[1] following the use of equine gonadotropin parallel the enthusiasm with which the gonadotropic hormone from pregnancy urine was received some eight or nine

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*From the University of Georgia School of Medicine, Augusta, Georgia.

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*The authors wish to acknowledge the cooperation of the pharmaceutical houses mentioned in *Chart 1* in supplying the gonadotropins used in this investigation. Credit is due Miss Ruth Stone for the preparation of the charts, Mr. Quinby Hair for technical assistance, and Miss Cecilia O'Connor for the preparation of the manuscript.

COMMERCIAL PREPARATIONS OF GONADOTROPIC HORMONES USED IN THIS STUDY

Group	Source	Preparation
1. Chorionic gonadotropin	Human pregnancy urine	Pranturon (Schering) Korotrin (Winthrop) Antuitrin-S (Parke, Davis)
2. Equine gonadotropin	Pregnant mares' serum	Gonadin (Cutter) Anteron (Schering) Gonadogen (Upjohn)
3. Anterior pituitary gonadotropin	Extracts of anterior pituitary of sheep and cattle	Gonadotropic factor (Armour) Preloban* (Winthrop) Prephysin (Chappel)
4. Combined gonadotropins	A. Evans synergistic factor (ant. pituitary) with human pregnancy urine	Synapoidin* (Parke, Davis)
	B. Pregnant mares' serum and human pregnancy urine	Anteron and pranturon (Schering)

*Not marketed.

Chart 1

years ago. It is now well known that of the latter the dosages then employed were too feeble to stimulate the human ovary. More critical in the analysis of results with equine gonadotropins have been the reports of Watson, Smith, Kurzrok,[2] Frank,[3] Hamblen,[4] Gray[5] and the very recent report of Ewing, Sears and Rock.[6]

Elsewhere one of us (R.B.G.) with Richard Torpin[7] reported an evaluation of the various gonadotropins and concluded that:

(1) Pregnant mares' serum, extracts of the anterior pituitary and the chorionic gonadotropins are capable of producing changes in the human ovary. The reactions may be twofold:

(1) Desirable
- (a) Increase in vascularity
- (b) Follicular growth
- (c) Hyperplasia of granulosa cells
- (d) Luteinization of the granulosa cells and cells of the theca interna
- (e) Ovulation
- (f) Corpus luteum formation

(2) Undesirable
- (a) Peri and intrafollicular hemorrhage
- (b) Cytolysis of the granulosa cells
- (c) Atretic follicles
- (d) Abortive corpora lutea
- (e) Imprisonment and degenerative changes of the ova
- (f) Hypertrophy and vacuolization of the cells of the theca interna with lipoid deposition

The reactions are not predictable, and concur-

No.	Age	Status	Amenorrhea Before Biopsy	No. Mos. Under Observation	Courses of Gonadotropins	Bleeding Periods	Curettages	E—	E	E+	M	Ps	P
1	21	Sterile	4½ mos.	22	15	17	10		7	1			2
2	19	Virgin	9 mos.	17	5	10	9		4	2	1	1	1
3	22	Virgin	12 mos.	16	9	12	4		2	1			1
4	20	Para ii	4 mos.	20	3	9	5	3				1	1
5	23	Sterile	9 mos.	18	4	12	10	2	3	1	2		2
6	30	Sterile	5 mos.	18	7	6	3		2	1			
7	28	Sterile	14 mos.	12	7	5	4		1	2			
8	25	Sterile	8 mos.	5	4	5	3	1					2

Chart 2

In a group of patients with functional amenorrhea, 48 endometrial biopsies were performed. Of the nine instances in which a progestinal endometrium was obtained, in only six instances was the preceding therapy gonadotropic. In the greater number of instances bleeding took place from an estrogenic endometrium in spite of gonadotropic therapy.

rent with the changes characteristic of one group there may be those of the other, one or the other predominating. Although it is generally appreciated that there are biologic differences (in the hypophysectomized rat, for instance) between extracts of the anterior pituitary or equine gonadotropin and chorionic gonadotropin, nevertheless in the human such differences become minimal, since it has not yet been shown that any of them accurately imitate the hypophysis in their activity. Chorionic gonadotropins seem chiefly to enhance luteinization of the stimulated follicle, and though anterior pituitary extracts and pregnant mares' serum may act similarly, they, at least in normal women, are also capable of stimulating the production of corpora lutea. Experimentally, however, this latter property is too often lacking in the human and the combination of desirable and undesirable reactions becomes apparent. There appears to be a failure in the coordination of the follicle stimulating factor and the luteinizing factor. With a view of synchronizing the effect of these two factors, a gonadotropin mixture has been released for experimental trial which contains Evans' synergistic factor of the anterior lobe with chorionic gonadotropin, known as "synapoidin." For some time before the advent of this new gonadotropic mixture we, as well as others (Ewing,[6] Hamblen[8]) have used combinations of equine and chorionic gonadotropin in the hope of improving the results obtained when the gonadotropins were used alone or following courses of estrogens. This paper deals with some of our experimental and clinical experiences with the gonadotropins when used alone or in combination. *Chart 1* tabulates the preparations used in this study.

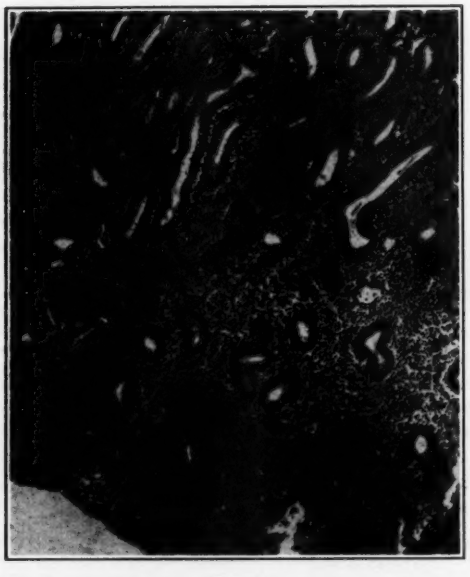

Fig. 1
A typical type of estrogenic endometrium from which bleeding took place following gonadotropin medication.

FUNCTIONAL AMENORRHEA

An evaluation of the effectiveness of the gonadotropins probably can best be ascertained in such a group. Many of the enthusiastic concepts concerning pregnant mares' serum and other gonadotropins are based on the receptiveness of the normal ovary to gonadotropic stimulation. In the functional amenorrhea group, it is assumed that the ovarian activity is below par because of inherent ovarian deficiency or because

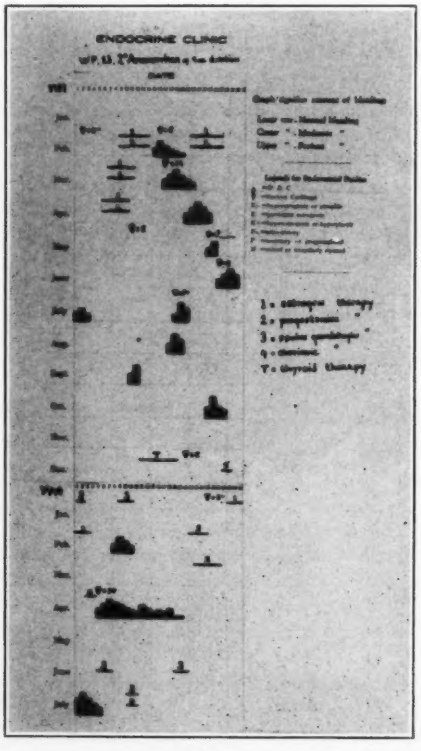

Chart 3
Note that estrogenic endometrium was obtained in January and April, 1940, in spite of extensive courses of gonadotropin medication.

of lack of extrinsic stimulating influences. In the study of such a group much may be learned from suction biopsies of the endometrium performed at the onset of bleeding or during intervals of amenorrhea when analyzed in the light of the therapy that preceded this procedure. For this purpose eight patients between the ages of 19-30, with functional amenorrhea were followed for a period varying from 5-22 months. Each one had, aside from other forms of therapy: repeated courses of the gonadotropins and from 3-10 suction biopsies performed during the period of observation. An opportunity was thus presented to analyze the value of gonadotropin medication (as compared to estrogen-progesterone therapy) by noting when possible whether the clinical improvement, that is, the induction of menstrual bleeding, was ovulatory or not. *Chart 2* tabulates the ages and status of the patients, the length of time under observation, the number of bleeding periods experienced by the patient, the number of suction curettages and their classification. A critical analysis of what may be expected after gonadotropic therapy in this group revealed that bleeding is more likely to take place from an estrogenic or hyperplastic endometrium, that is, anovulatory than ovulatory, as mirrored by a progestinal endometrium.

Of the 48 endometrial biopsies studied, there were only nine instances in which a progestinal endometrium was obtained. On 23 occasions, courses of gonadotropins were administered prior to the biopsies, but in only six instances was a progestinal endometrium obtained. The 3 instances in which a progestinal endometrium was secured in spite of no treatment makes it quite obvious that patients with functional amenorrhea may have a peculiar arrythmic type of cyclical ovulation. Repeated curettages may strike the occasional ovulatory phase and hence this finding must not be attributed wholly to the possible influence of gonadotropin medication. The proof that women with functional amenorrhea do ovulate at times is further substantiated by the fact that in another series three patients recently conceived without specific therapy. Although there was clinical improvement in the patients and the number of so-called menstrual periods increased considerably, nevertheless the preponderance of estrogenic types of endometrium from which bleeding took place (*Fig. 1*) following gonadotropin medication leads us to suspect that this form of therapy has but little effect on the frequency of ovulation in this group (*Charts 3, 4, 5*).

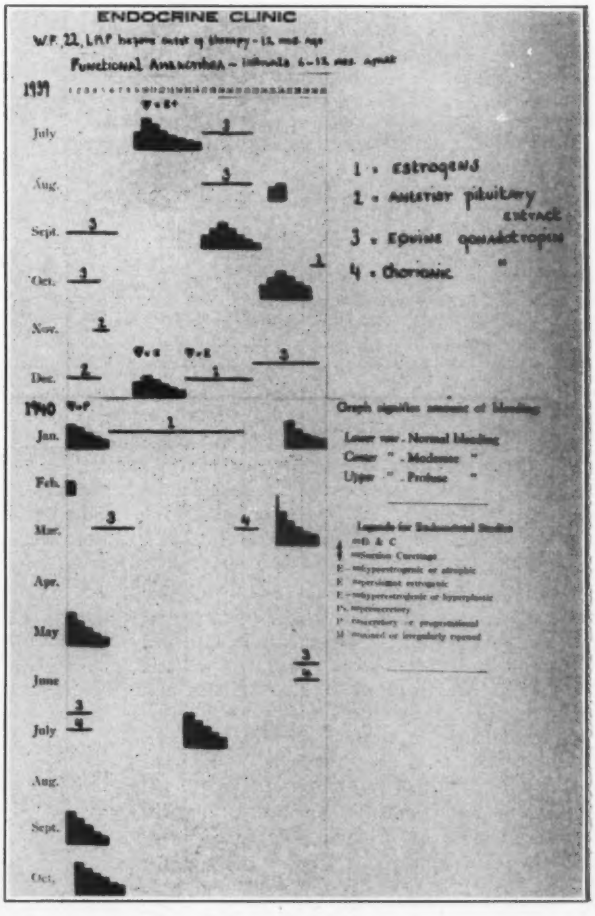

Chart 4

Note marked increase in menstrual periods following gonadotropin medication in a white woman of 22 who previously had but one or two menstrual flows per year. A progestinal endometrium was obtained in January, 1940, after estrogen and pregnant mares' serum therapy.

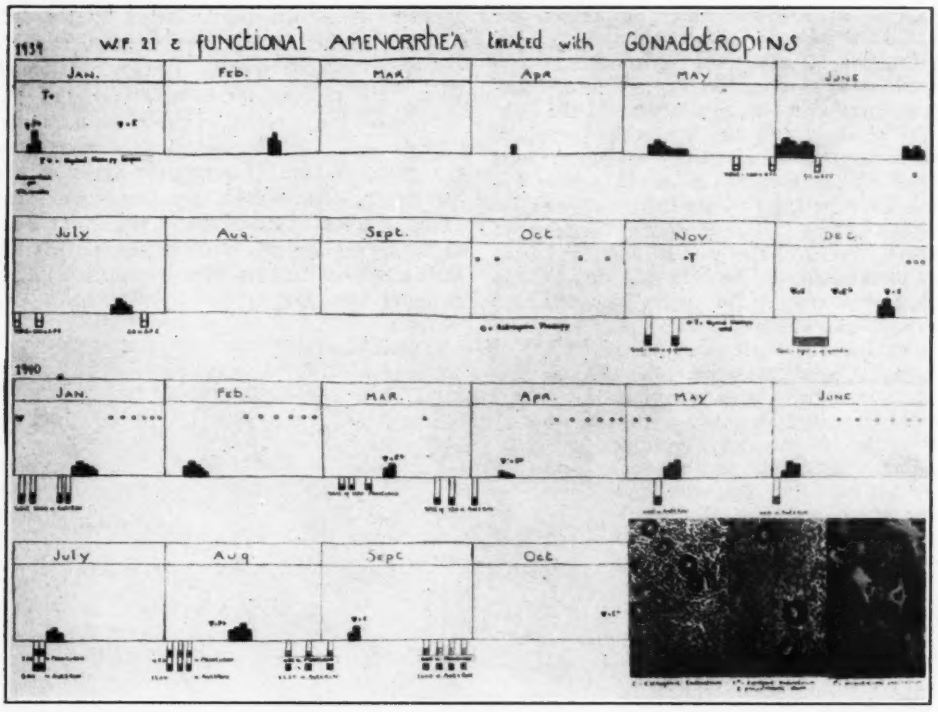

Chart 5

Note that suction curettages performed in December, 1939, and March, April, September, October, 1940, each following courses of gonadotropins, yielded estrogenic endometrium. On three of these occasions the stroma was decidua-like in character. A progestinal endometrium was obtained in August, 1940, after combined equine and chorionic gonadotropin therapy. However, a similar endometrium was present at the first curettage in spite of no previous treatment.

PREGNANDIOL GLUCURONIDE STUDIES AND FALSE PROGESTINAL RESPONSES OF THE ENDOMETRIUM

One of the dominating properties of anterior pituitary extract, pregnant mares' serum and chorionic gonadotropin is the ability to luteinize the cells of the theca interna (*Fig. 2*). This is noticeable in the theca of normal follicles and more especially in the theca of atretic follicles (*Fig. 3*) and also in corpora atretica (*Fig. 4*). This luteinization is not infrequently reflected by the appearance of pregnandiol glucuronide in the urine when none is expected to appear. Varying amounts of urinary pregnandiol were obtained following gonadotropic therapy in amounts from 0.7 mg. to 18 mg. The endometrium frequently reflects this luteinizing quality by the appearance of false progestinal changes such as a decidua-like stroma with an estrogenic endometrium (*Fig. 5*) or a hyperplastic estrogenic endometrium with very occasional glands in the presecretory phase. The presence, therefore, of pregnandiol glucuronide in the urine in small amounts or the false progestinal endometrial reactions cannot be interpreted as evidence of ovulation and corpus luteum formation, but rather as a reflection of ovarian luteinizing responses due to gonadotropin medication.

PRIMARY AMENORRHEA

Two patients with primary amenorrhea, aged 28 and 20 years, respectively, were followed for a period of two years.* Both had received many individual but extensive courses of estrogens, anterior pituitary extracts, chorionic gonadotropins and pregnant mares' serum without effect. Bleeding could be induced when courses of estrogen and progesterone were administered simul-

*These two cases will be reported in full detail elsewhere with Dr. Bowcock, of Atlanta, Georgia.

taneously, a method previously advocated by one of us (R.B.G.[9]) and much stressed by Hamblen.[8] A suction curettage performed in the 28-year-old patient at the time of onset of bleeding following such therapy revealed a hypoestrogenic type of endometrium. Another patient, a well-developed girl of 15 years who had never menstruated, received 1,600 (Cole-Saunders) units of "gonadin" over a period of three days. One week after the onset of therapy a laparotomy was performed (legal sterilization) and the ovaries were carefully studied and biopsies taken. Grossly the ovaries appeared to have been mildly stimulated; several small follicular cysts were present. Histologic study revealed increased perifollicular vascularity, hyperplasia of the granulosa cell lining and hypertrophy of the cells of the theca interna as well as several atretic follicles. No evidence of recent or old corpora lutea was present. The endometrial biopsy showed an estrogenic endometrium. Hormonal studies on a 24-hour specimen of urine obtained at this time assayed 10 r.u. of estrogen and 0.7 mg. of pregnandiol glucuronide. How can we interpret the findings in these three cases? Gonadotropins failed to produce ovulation or cause bleeding, whereas bleeding could be induced when combined courses of estrogen and progesterone were administered.

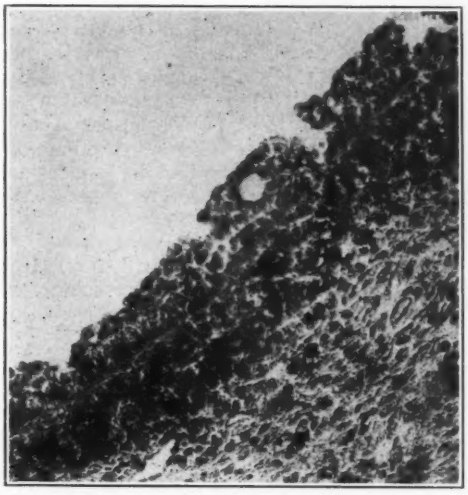

Fig. 2
Note the lipoid deposition (photographs black) in the theca interna, on the eighth day of a normal cycle, following 10 c. c. of gonadotropic factor (Armour). Sudan III—hematoxylin stained frozen section.

Fig. 3
Note the hypertrophy and vacuolization of the cells of the theca interna (a) following "gonadin" (Cutter) medication.

THE GONADOTROPINS AND THE NON-RECEPTIVE OVARY

The excellent studies of Davis and Koff,[1a] Seigler and Fein[1b] and others prove without doubt that the normal human ovary is capable of being stimulated by pregnant mares' serum with resultant maturation of follicles and development of corpora lutea. This is not, however, proof that ovulation may similarly be stimulated in the subthreshold ovary. Their enthusiastic conclusions are based upon the effectiveness of pregnant mares' serum on responsive or normal ovaries. Normal ovaries do not require therapy. What is the effect of the gonadotropins upon non-receptive ovaries? The administration of gonadotropins is usually intended for conditions where there is primary or secondary ovarian failure. If physiologic responses could be obtained during non-receptive states of the ovary, then the cause of gonadotropin medication might be enhanced. Since bitches experience but two estrus cycles per year, during which time the male is acceptable, it was felt that the long anestrus periods might be analogous to the non-receptive states of the human ovary to stimulation and comparable to the human female with functional amenorrhea who ovulates occasionally at her own rate. Seven bitches with known estrus cycles were subjected to therapy with the various gonadotropins early in their anes-

Fig. 4

Note at A (left) the luteinized corpora atreticum and at A (right) luteinization of degenerating corpus luteum, following 60 units of gonadogen (Upjohn) therapy.

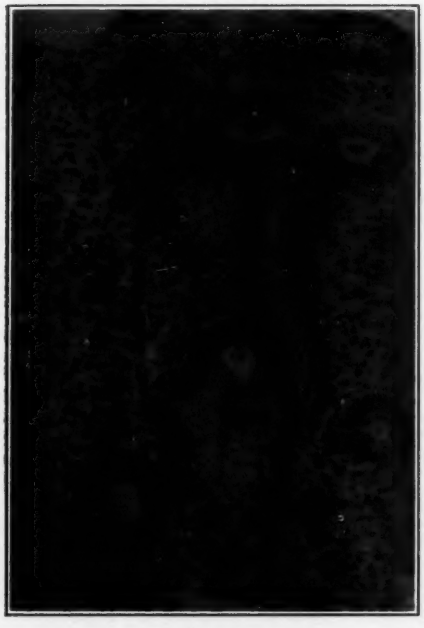

Fig. 5

Estrogenic endometrium with hypertrophy of the stroma cells (false progestinal change) following 750 units of "anteron" (Schering).

trus periods, and *Chart 6* chronicles the results. The improvement in the vaginal hydrogen ion concentration, vaginal smears, the increase in turgescence of the genitalia (*Fig. 6*), the willingness to consort with the male and the acceptance of coitus by two bitches, one following a course of pregnant mares' serum ("anteron") and the other a combined course of pregnant mares' serum and chorionic gonadotropin ("anteron" - "pranturon") seems to indicate at least that certain of the gonadotropins are capable of stimulating some normal ovaries during their non-receptive states or subthreshold phase.

GONADOTROPINS AND HYPOPHYSECTOMIZED BITCHES*

Three bitches that survived hypophysectomy were subjected to gonadotropin medication (*Chart 7*). The vaginal pH and smears improved and genital turgescence increased considerably. However, the bitches did not attract the male and coitus was never attempted. This situation was not improved when followed by a course of estrogens. Although this series is too small to be conclusive, it appears that in the bitch the gonadotropins are more effective in the presence of a normal pituitary gland.

"SYNAPOIDIN"

In the hope of overcoming the imbalance between the follicle stimulating and the luteinizing factors contained in the preparations on the market at this time, a new gonadotropic mixture has been developed which is a combination of human chorionic gonadotropin with a synergistic factor from the anterior pituitary lobe. According to Evans,[10] its action differs markedly from that of chorionic gonadotropin. These differences are: (1) human chorionic gonadotropin is limited in its capacity to increase ovarian size in the normal immature female rat.

*Grateful acknowledgment is made to Dr. R. F. Slaughter for the hypophysectomies performed on the bitches.

THE EFFECT OF GONADOTROPINS IN THE KNOWN ANESTRUS BITCH

	Medication	Total Dosage	Gross Vaginal Changes	Vaginal Smear	Vaginal pH	Remarks
1. In heat 8 to 9 weeks preceding this investigation	"Prephysin" (Chappel)	125 u.	At outset vagina small and pale in color. By 11th day marked turgescence and reddening of vaginal mucosa	1st day 2+ 4th day 2/3+ 14th day 3+	3rd day 7.5 4th day 7.0 14th day 6.5	Evidenced some signs of heat, but did not have intercourse. Regression set in about 21st day
2. Weaned litter 8 weeks prior to this study	"Anteron" (Schering)	2000 u.	At beginning of study vagina small and pale. Marked enlargement by 20th day	1st day 1+ 3rd day 2+ 5th day 2/3+ 11th day 3+	3rd day 7.5 5th day 7.0 9th day 6.5 14th day 6.0	Marked signs of heat by 14th day. Had coitus on 17th day. (Died on 22nd day)
3. In heat immediately preceding this study	"Anteron" "Pranturon" (Schering)	2000 u. 3750 u.	Vagina small and pale at first. Genitalia were red and turgescent by the 9th day	1st day 2+ 3rd day 2/3+ 11th day 3+	2nd day 7.0 9th day 6.5 14th day 6.0	Marked stimulation by the 11th day. Had coitus on 14th and 15th days
4. Had pups two weeks previous. Pups put to death. Still lactating	Gonadotropic factor (Armour)	3000 u.	Vagina large on first examination. Bloody discharge on 3rd day. Mucoid discharge always	1st day 1+ 4th day ½+ 5th day 2+ 6th day 3+	3rd day 6.5 4th day 6.0 14th day 5.5	At no time did this animal show signs of heat
5. Heat 7 to 8 weeks preceding this experiment	"Gonadogen" (Upjohn)	50 u.	Vagina small at outset. No apparent change by 10th day	1st day 2+ 3rd day ½+ 9th day ½+	2nd day 6.5 9th day 6.5	No appreciable stimulation. (Died on 10th day)
6. Heat 12 to 15 weeks earlier	"Gonadin" (Cutter)	1000 u.	Initial size of vagina small. Some enlargement and reddening by 10th day	1st day 2+ 7th day 2/3+ 14th day 3+	3rd day 7.5 5th day 7.0 6th day 6.5 10th day 6.0	Mild stimulation
7. Heat terminated 2 to 3 weeks prior to investigation	"Synapoidin" (Parke, Davis)	75 ru.	Vagina very small. Enlarged to twice original size by 6th day	1st day 2+ 6th day 3+ 8th day ¾+	3rd day 6.5 6th day 6.0 8th day 5.5	Some signs of heat. Dog refused to mate

Chart 6

The medication in this series was given subcutaneously in five equal doses in a six-day period.
Note that coitus occurred in two bitches, in one after a course of "anteron" (Schering) and in the other after "anteron"-"pranturon" (Schering).

The weights secured in a four-day interval of treatment in the Long-Evans strain of rats are never greater than 50-70 mg., an effect secured with the administration of 100 units and all higher unitages up to 5,000. One-fifteenth to one-twentieth c. c. of "synapoidin" will produce this same effect; increasing ovarian growth being obtained with increasing dosage. (2) Human chorionic gonadotropin causes no follicle stimulating effects and no significant development of the sex skin in female monkeys, but with "synapoidin" follicle growth accompanied by luteinization of the ovaries is induced. It is claimed that the addition of pituitary synergist to chorionic gonadotropin makes its action similar to pituitary implants, crude anterior lobe extracts and pregnant

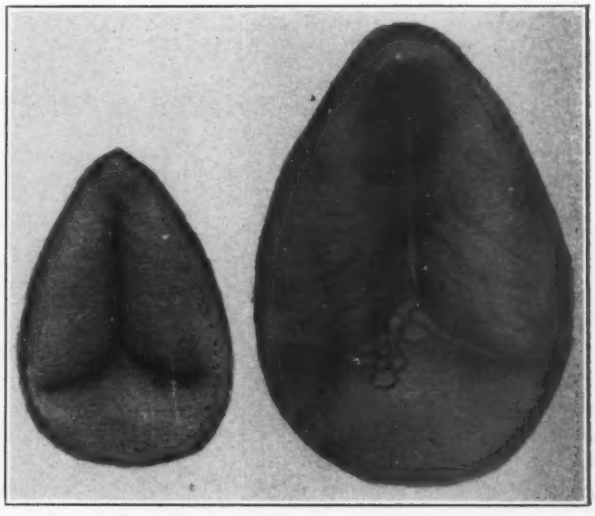

Fig. 6
Increase in turgescence of genitals of the bitch following gonadotropin medication.

mares' serum. (3) The genital system of the female hypophysectomized rat remains in an infantile or atrophic state after treatment with human chorionic gonadotropin, the only demonstrable effects being hypertrophy of the internal theca or interstitial cells of the ovary. On the other hand, this hormone, when combined with the pituitary synergist, is just as effective in stimulating the growth of the ovaries of hypophysectomized rats as is the case with normal immature rats (Evans *et al.*).

OBSERVATIONS IN THE HUMAN FEMALE FOLLOWING "SYNAPOIDIN"

Six patients with clinically normal functioning ovaries who were to be submitted to laparotomy for gynecologic disorders such as fibromyomas or chronic salpingitis, received a course of 5 injections of 2 c. c. of "synapoidin" from 2-5 days prior to operation. The patients were in various stages of their cycles and varied in age from 27-48 years. An analysis of the histologic sections of ovarian biopsies revealed that the

THE EFFECT OF GONADOTROPINS IN THE HYPOPHYSECTOMIZED BITCH

Medication	Total Dosage	Interval from Operation to Initial Dose	Gross Vaginal Changes	Vaginal Smear	Remarks
1. "Synapoidin" (Parke, Davis)	132 ru.	8 days	Gradual increase in size of genitals and turgescence of mucosa. Blood tinged mucoid discharge about 20th day	2+ at operation 0-1+ at 1st inj. 3+ at last inj.	Mild stimulation. No apparent signs of heat. No change after administration of 5 mg. stilbestrol on 27th and 29th days
2. Gonadotropic factor (Armour)	1650 u.	5 days	Increase in size of the genitals and turgescence	1+ at operation 2+ at last inj.	No evidence of heat. Marked mucoid discharge for several days after stilbestrol (10 mg.)
3. "Prephysin" (Chappel)	220 u.	2 days	Enlargement of vaginal orifice and mild turgescence of genitals	1+ at operation 2+ at last inj.	No heat produced. No apparent reaction to stilbestrol given on 27th and 29th days. Died on 32nd day

Chart 7

Eight bitches were submitted to hypophysectomy, but only three survived long enough to make observations.
Total dosage administered over period of 18-20 days.
Genital turgescence occurred in the hypophysectomized bitch following gonadotropin medication.

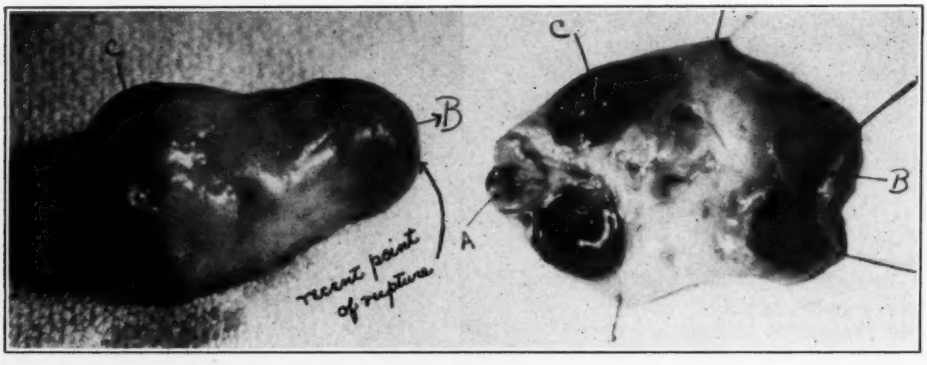

Fig. 7

Ovary removed on the twenty-fifth day of the menstrual cycle after 10 c. c. of "synapoidan" (Parke, Davis) in a colored female 48. On sectioning the ovary are seen: (a) current corpus luteum; (b) hemorrhagic corpus luteum; and (c) hemorrhagic lutein cyst.

action of "synapoidin" exhibited a greater tendency to produce maturation of follicles than did human chorionic gonadotropin. In 2 of 6 cases, a recently ruptured corpus hemorrhagicum aside from the current corpus luteum was found. The following case is selected because it represents an excellent response which is rather easy of interpretation.

A negress, aged 48, with a regular menstrual cycle, was hospitalized because of massive fibromyomata uteri. On the twenty-first day of her menstrual cycle, "synapoidin" medication was started, 2 c. c. being administered intramuscularly every 12 hours until 10 c. c. were given. On the twenty-fifth day of the cycle laparotomy was performed. The left ovary showed marked capsular fibrosis without any response. The right ovary was very much enlarged and showed three bulging areas which were discolored brownish yellow to brownish blue. A recent point of rupture was noted at the apex of the right lateral budge. The ovary was removed and on bisecting it (*Fig. 7*) it appeared that "a" was a well-developed corpus luteum and "b" and "c" were fresh hemorrhagic corpora lutea. Histologic sections revealed that "a" represented the current corpus luteum. The cavity was lined with a fibrous wreath (*Fig. 8*) and was about 7-9 days old. "B" represented a fresh corpus luteum with the cavity filled with blood and coagulum and was about 2 days old (*Fig. 9*), while "c" represented a fresh hemorrhagic lutein cyst (*Fig. 10*). The endometrium of the uterus was, as expected because of the cycle, in the secretory phase. It is fair to assume that "synapoidin" was probably responsible for the hemorrhagic lutein cyst (undesirable reaction) as well as the fresh corpus luteum (desirable reaction).

In 4 of the 6 cases, however, no fresh corpora lutea were demonstrable that could be attributed to the medication. In one a large lutein cyst with perifollicular hemorrhage was present alongside with the current corpus luteum and

Fig. 9
Recent corpus luteum (B in *Fig. 7*). Cavity filled with blood and coagulum (about 2 days old).

Fig. 8
Current corpus luteum (A in *Fig. 7*) about 7-9 days old. Note fibrous wreath (a) lining cavity.

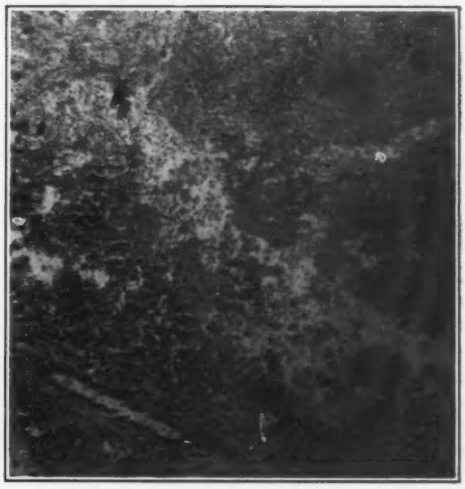

Fig. 10
Recent hemorrhagic lutein cyst (C in *Fig. 7*).

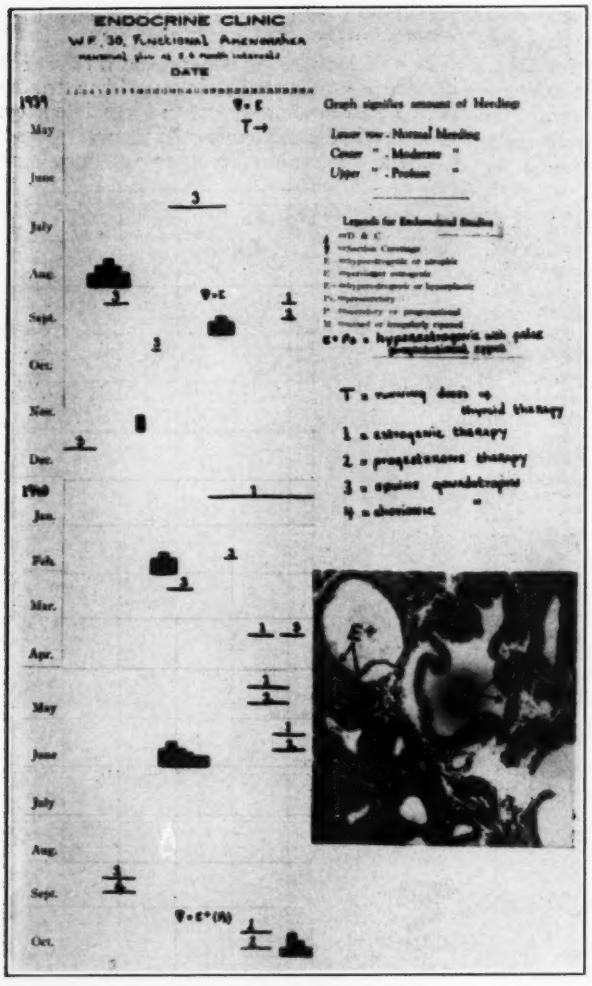

Chart 8
Indifferent results following gonadotropin medication in a white woman of 30 with functional amenorrhea.

in the others atretic follicles, proliferating follicles and luteinization of the theca cells were in evidence.

In the clinical application of "synapoidin," our observations are too recent. In a patient with oligomenorrhea who failed to respond to thyroid therapy and anterior pituitary extract, excellent response was obtained with "synapoidin." In another patient with secondary amenorrhea (syndrome of anorexia nervosa) of one year's duration neither a course of anterior pituitary extract nor a course of "synapoidin" was capable of inducing menstruation, although there was clinical improvement of the patient. Several patients with sterility are being treated with this preparation and results will have to await further observation.

COMBINED EQUINE AND CHORIONIC GONADOTROPIN THERAPY

Cyclic gonadotropic therapy has been advocated by Hamblen because in his experience responses are not secured in ovarian failure from equine gonadotropins except in occasional cases. By administering equine and chorionic gonadotropins it was hoped that this combined therapy might complement any pituitary deficits. We have resorted to this method of therapy for quite some time in cases of functional or secondary amenorrhea with moderately good results. These results are, in a measure, comparable to the excellent results obtained with combined estrogen and progesterone therapy. However, very occasional cases fail to respond to either mode of therapy. *Chart 8* illustrates such a case. On the other hand, *Chart 9* is a typical example of the good results that frequently follow combined equine and chorionic gonadotropin therapy. Note that a progestational endometrium followed this form of therapy.

CONCLUSIONS

(1) Evidence is presented that makes it difficult to believe that in functional or primary amenorrhea the gonadotropins can stimulate the subthreshold ovary to ovulation and corpus luteum formation in spite of the clinical improvement of the patient. On 23 occasions courses of gonadotropin medication preceded the 48 endometrial biopsies studied in a group of 8 patients with functional amenorrhea. A progestinal endometrium was obtained in 6 instances following such gonadotropin therapy. Menstrual bleeding occurred most frequently from an estrogenic endometrium.

(2) The presence of pregnandiol glucuronide

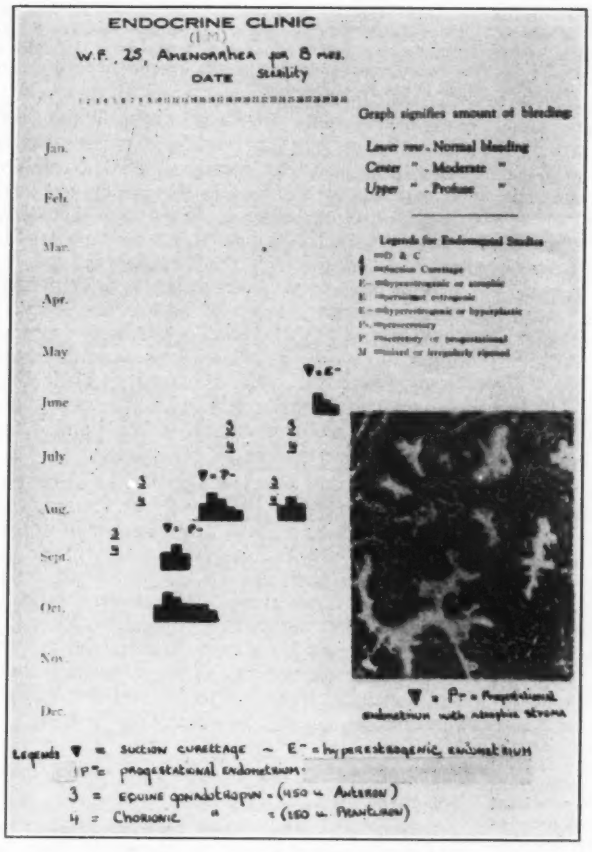

Chart 9
Excellent results following combined equine and chorionic gonadotropin in a white woman of 25 with secondary amenorrhea.

in the urine following gonadotropin medication at a time when none is expected and the appearance of false progestinal responses of the endometrium do not indicate ovulation and corpus luteum formation, but probably reflect the luteinization of atretic follicles or corpora atretica of the ovary as a result of medication.

(3) Seven bitches with known anestrus cycles were treated with various gonadotropins. The genitalia in all responded by manifesting turgescence and improvement in vaginal smears and two bitches accepted the male in coitus. This leads one to believe that the gonadotropins can stimulate the normal ovary at least in bitches during the non-receptive phase.

(4) A new gonadotropic mixture containing a synergistic factor from the anterior pituitary lobe and chorionic gonadotropin evoked responses in the normal human ovary similar to that obtained following pregnant mares' serum or extracts of the anterior pituitary.

(5) Bleeding could be induced with more regularity following combined administration of equine and chorionic gonadotropins than when administered alone, but the bleeding except in rare instances occurred from an estrogenic endometrium.

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DISCUSSION (*Abstract*)

Dr. Gilbert S. Douglas, Birmingham, Ala.—As Dr. Greenblatt said, pregnant mares' serum, extracts of the anterior pituitary gland and the chorionic gonadotropins are capable of producing changes in the human ovary, but we are unable to expect uniform results, even though our cases are well worked up.

No doubt there is failure of the follicle stimulating factor and the luteinizing factor in many cases, and I am very much interested in his study of the synchronizing effect of these two factors in the new gonadotropin which he has been using.

In functional amenorrhea, menorrhagia and metrorrhagia, we have been studying the endometrium for several years from specimens obtained by the use of the suction curette. We have obtained over three hundred biopsies in over one hundred cases, and we find this very helpful in the selection of our treatment.

In primary amenorrheas and functional amenorrheas we have obtained very good results from the use of gonadotropins where they were indicated, but I do not think that we should expect too much from the use of these products in our attempt to produce ovulation where there is a subthreshold ovary. Further, there are many failures because the dosage is too small.

Dr. Greenblatt's suggestion that the anestrus period in the dog might be comparable to the cycle of the human female who ovulates occasionally is a point which gives food for thought; for there are a few women who conceive in the absence of menstruation.

The study of the different preparations and their effects is rather confusing, certainly to those not particularly interested in this subject. If we recall that the terms, gonadotropes and gonadotropic principles, are applied to products which influence the function of the gonads, the ovaries and testicles, it becomes simpler.

The existence of a gonad-stimulating function of the pituitary was established almost simultaneously in 1926 and 1927 by two groups of workers, Smith and Engle in the United States and Zondek and Aschheim in Germany. These workers demonstrated that implants in the pituitary induce growth and maturation of the ovaries of immature female rodents, and likewise were capable of producing reparative changes in the ovaries of hypophysectomized rodents. Subsequent study showed that these seem to produce similar effects in the male gonads.

Dr. Lawrence R. Wharton, Baltimore, Md.—I should like to ask how long have these cases been followed after the treatment was stopped? Does the menstrual cycle revert, Dr. Greenblatt, to the former irregularity, or does it ever resume or continue in a fairly normal way?

Dr. Greenblatt (closing).—Frequently following the discontinuation of gonadotropin therapy there may be a temporary re-establishment of a menstrual cycle which may last several months. However, in only occasional cases are the results permanent and the patient soon reverts to a phase of amenorrhea. The therapy, however, is satisfying to the patient, for she not only feels physically improved, but there is also a psychologic readjustment in knowing that she can be made to menstruate like other normal women.

PYURIA*

By JOHN E. ASHBY, M.D., F.A.A.P.
Dallas, Texas

Those of you who have studied the large number of excellent works that have recently appeared on the necessity for more careful consideration of urinary infections in infancy and childhood realize that greater cooperation between pediatrician and urologist is definitely needed. In Brennemann, Helmholz[1] said:

"The diagnosis of pyelitis is incomplete so long as abnormalities of the urinary tract have not been excluded, and treatment of the condition is incomplete if in addition to clearing up the infection normal drainage is not re-established."

In their most excellent work, Weiss and Parker[2] point out that pyelitis is in reality pyelonephritis, and is uniformly associated with lesions of the parenchyma of the kidney, not confined to the pelvis alone. They state that early pyelonephritis in childhood often leads to the pyuria of pregnancy, the vascular changes of arteriosclerosis and hypertension, and the permanently damaged kidney of later life. Vascular changes and hypertension do not occur in renal tuberculosis and hydronephrosis uncomplicated by pyelonephritis. The statement is made that chronic and healed pyelonephritis occurs more often than chronic glomerulonephritis and is the most frequent disease of the kidney.

The fact that pus found in the urine can be made to disappear rather easily in the majority of cases tends to make us grow careless in watching for the case that needs further urologic investigation. There are two frequent errors made in treating these cases: (1) simple treatment without proper results is continued too long, (2) proper follow-up is not made to determine permanent cure or recurrence. If we, as pediatricians, will remember these two indications for urologic consultation, we will be worthy of the trust imposed upon us by parents.

Glenn,[3] before this Section last year, pointed out that

"A number of children with urologic conditions are untreated because of the lack of information concerning present day facilities for this type of examination."

Too often we are too concerned about the acute case of pus in the urine and not attentive enough to the resultant kidney damage that can and frequently does occur.

It is unnecessary, expensive and not wise to subject every child who shows some pus in the urine to a complete urologic study. Undoubtedly, the great majority will respond to simple, well organized and carefully observed treatment. These are undoubtedly cases of very slight involvement of the kidney parenchyma. We must realize that a great difference can occur in the extent of the kidney involvement regardless of the actual number of pus cells shown in the urine. The severity of this damage cannot be measured by the cell count. It is even true that we do not so frequently examine the urine as we should in providing a good complete examination

*Read in Joint Session of Section on Pediatrics and Section on Urology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

for the sick or well child. Lindner,[4] in his paper last year before this Section, showed that 47 per cent of 123 nephrectomies had had symptoms for more than a year. Presumably, many of these had previously shown trouble in childhood. He pointed out some of the primary and secondary causes of pus in the urine. Recently, I was surprised to find that 535 of 1,822 routine urinalyses done in my office laboratory showed pus, ranging from 8 cells per field, uncentrifuged, to hundreds of cells. These urinalyses were done as part of a physical examination, regardless of whether the child were sick or well, or showed urinary symptoms or not.

Hepler and Scott[5] showed that half the children with demonstrable urologic disease had what is considered the normal number of pus cells. They pointed out that 36 per cent of children showing pus in the voided uncentrifuged specimens showed only 9 per cent in the catheterized uncentrifuged specimens.

The average case of pyelitis is considered to be a child with a 75 per cent chance of being above 2 years of age, an 85 per cent chance of being a girl, and a 5 to 30 per cent chance of being associated with an anomalous condition, and having an infection, which has an 80 per cent chance of being a colon-aerogenes bacillus, and a 15 per cent chance of being a streptococcus or staphylococcus.

Bigler[6] has shown the frequency of a number of anomalous conditions found in childhood, all of which produced symptoms of urinary tract disease. He points out that congenital anomalies are apparently much more apt to be a cause of hydronephrosis than infection alone. On this basis, infection as shown by pyuria is apt to be due to an anomaly, and relieving the infection by medication will in no way result in a cure. Campbell[7] says that pyuria is a major symptom of anomalies of the upper urinary tract.

The symptoms of pyelitis are far too familiar to you to be dealt with. It is sufficient to keep in mind that the condition should be remembered, even suspected, in the sick child. It is likely that no constant chain of symptoms will appear to make the diagnosis easy. In the small infant, pyelitis can cause any number of symptoms, such as restlessness, chills, vomiting, distention, diarrhea, fever, dysuria, pain and even skin rash, convulsions and meningeal symptoms. In diagnosing pyelitis we are frequently puzzled by borderline cases. Every child showing a few pus cells in the urine is not a case for excessive treatment. Simple increase in fluid intake and possibly changing the pH of the urine will suffice if the condition is correctly followed to make sure more severe trouble is not being overlooked. Aside from the routine urinalysis and response to treatment, what else can we do to ascertain the degree of urinary trouble? Culture of the urine and stained smear of the sediment are not too difficult for the average office to obtain. It has been shown repeatedly that medication alone will not clear all urologic infections and provide a permanent cure. Pyelogram, either by intravenous, intramuscular or catheter route, is a great aid, used far too infrequently. Cystoscopy is a most valuable adjunct and is now very simply done.

Merely to make the diagnosis of pyelitis, without consideration of the location of the trouble and the causative organism, is to overlook a very important part of the pediatrician's work. A complete examination should be made to determine, if possible, infection elsewhere in the body. The frequency of kidney infection associated with otitis, gastro-intestinal disease and tonsillitis, is well known. Probably as important as treating the condition is to determine the presence of associated infections, which must be treated diligently and cleared as rapidly as possible if desired results are to be obtained in clearing the urine.

Care of nutrition, preventing excessive weight loss and careful watch for acidosis and dehydration are parts of the pediatrician's job. The child must be made as comfortable as possible. Sedation is a frequent and helpful adjunct to other medication. Fever must be controlled enough to permit rest and prevent possible onset of convulsions. Necessary minor and even major changes in diet are often imperative to aid digestion of food, control vomiting and prevent diarrhea. Carbohydrates may be pushed to the limit of tolerance, but must be watched for excessive fermentation; fats should be decreased during the stage of acute symptoms. Liquids should be given freely, but not necessarily forced unless there is a drastic let-down in intake.

The method of treatment *per se* is not so important as is the necessity that the job of sterilizing the urine be adequately done, that no recurrence be overlooked, and that the kidney be not left in a damaged condition unrecognized. This is made possible only through urine cultures, pyelograms, cystoscopy and careful follow-up of the patient.

As listed by Helmholz,[1] there are five major considerations in the treatment: (1) elimination

of bacteria and their toxins by washing out of the urinary tract, (2) increasing resistance of the individual by proper diet and by specific therapy, (3) medication, acidification and alkalinization of the urine, (4) elimination of all foci of infection, and (5) relief of stasis by instrumentation or surgical procedures. In treatment, it is of utmost importance to remember that the case which does not respond to treatment within a reasonable length of time by urinary antisepsis, should be suspected of an anomaly and further urologic examination should be done.

Treatment should, of course, depend largely upon the causative organism shown by urine culture.

Fluid administration has been repeatedly urged as a method of flushing the urinary tract of infection. As far as is known, any fluids the patient will take are advantageous. Milk, fruit juices, carbonated drinks, soups, ice cream, and so on, may be urged. As much as possible of this volume should be given by mouth. We have reason to feel that this method possesses particular advantages and should be more successful if patience and ingenuity are exhibited. Fluids by bowel and by intravenous route may have to be supplemented. Clysis by skin may be used if the blood circulation responds to its task in absorption. Treatment of any type should be started with care, particularly if there is a likelihood of vomiting, diarrhea, acidosis or dehydration. Factors governing these conditions must be given particular attention. One should not be too quick to start the medicine.

The dyes as urinary antiseptics have not proven of great value in infancy and childhood. If valuable in individual hands, there is no reason for not using them, since they are more or less harmless. Acriflavine, hexylresorcinol and methenamine and other antiseptics have been used. The latter, while still quite popular, has been largely supplanted by the more effective use of sulfanilamide and mandelic acid.

Alternate acidification and alkalinization of the urine is a time-honored method of treatment. There are many fairly efficient means of carrying out this procedure, but it must be remembered that the urine must range from a pH of 4.5 to 9.0 to be bacteriostatic in its action. Particularly difficult is it to reach an alkalinity of this degree. Soda bicarbonate and sodium citrate are probably the drugs of choice. It will be advantageous if all kidney medicaments are administered as pleasantly as possible, with a pleasing taste and a thought as to their effect on nausea and vomiting. Diet is of some advantage in helping acidify or alkalinize the urine, but not to a great extent. Alkalinizing drugs should be administered according to weight and age. Seven to 10 grains four times daily is a good average dose for the small child.

Ketogenic diets have been largely replaced by mandelic acid therapy, due to difficult management of the diet and the apparently more inhibitory action on the organism by the drug. The ammonium salt of mandelic acid, given usually in syrup form, has its best effect upon the gram-negative colon group, and to some extent upon staphylococcus and streptococcus fecalis. The dose should be based upon 15 grains per 100 c. c. of urine excreted.

It must be remembered that mandelic acid will produce its best results only if there is a concentration of the drug of 0.5 to 1.0 per cent in the urine, if adequate dosage is given, and if the urine pH is 5.2 or below. Frequent checking of the acidification of the urine is necessary to maintain a low pH. In small children, the elixir is valuable, while in older children either the syrup or calcium mandelate tablets may be used. Mandelic acid is apparently the most effective drug against streptococcus fecalis, and is ineffective against pyocyaneus.

The sulfonamide group of drugs has given us the greatest aid of any therapeutic measures of this type. While the use of sulfapyridine is limited, and even contraindicated in some urinary disease, sulfathiazole has apparently been of great aid in staphylococcic infections as well as infections of other types. Sulfanilamide has enjoyed widespread use.

Summerfeldt and Mitchell[8] state that sulfanilamide is more effective in children than in adults, possibly due to the smaller number of obstructive conditions in children, and the fact that more cases of pure *B. coli* infection are found. Its effect is greater in conditions where there is a persistently alkaline pH, but it will work in both acid and alkaline environments. The usual contraindications of the use of the drug must be observed, and untoward side effects of agranulocytosis, fever, rash, hemolytic anemia and suppression of excretion must be watched for. Unless there is evidence of acidosis, bicarbonate of soda need not be administered with the drug.

A common mistake in the use of the sulfonamide group is to discontinue the use of the medicine too quickly after the disappearance of pus from the urine. Sterile cultures should be

obtained before its cessation. Doses of ¾ to 1½ grains per pound of body weight are effective and tolerated well by the great majority of pediatric cases. Many cases of so-called recurrences are possible exacerbations of an infection which has not been removed.

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See note at bottom of paper of Dr. Pace, page 751.

CHRONIC URINARY INFECTIONS IN CHILDREN*

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At this time I wish to consider the persistent and recurring pyurias of childhood which have resisted appropriate medical treatment for four weeks or longer. The medical problems have been ably presented by the pediatrists of this symposium and I wish briefly to outline a method of urologic investigation and later to point out the possible anatomic defects and pathologic findings which may be responsible for the continued or recurrent infection.

In considering the infant or young child presented for urologic examination it is imperative that an accurate history be obtained from the mother or pediatrist. The age of the child is noted, duration of symptoms ascertained and such pertinent data as whether the pyuria was found following an acute upper respiratory infection, the presence of an initial elevation or continued temperature, pain, tenderness or palpable mass in the kidney or bladder areas; dysuria, hematuria, frequency, urgency or enuresis. A resumé of the results of past physical examinations, urinary findings and other laboratory procedures and drugs prescribed, is helpful in the preliminary survey.

In the examination of the child, one should proceed in a definite and orderly fashion. The temperature is determined with either the rectal or oral thermometer, depending upon the age of the child; the pulse is counted, but I make no effort to count the respirations of an apprehensive, frightened, or crying child. At this point I request the child's mother or nurse to leave the examining room if it seems probable that the child will be wholly uncooperative. With the child undressed, recumbent and resting as quietly as possible, the abdomen is carefully observed for evidence of prominent superficial veins. Palpation may reveal an enlarged kidney or mass. Tenderness, if present, is usually determined by a sharp and sudden cry. A flat percussion note suprapubically suggests a full or overdistended bladder and a later determination for residual bladder urine is indicated. The external genitalia should be carefully examined. In boys, the presence of an adherent prepuce, pinpoint urethral meatus, hypospadiac deformity, undescended testes, or urethral discharge are findings of importance. In the female the vulva is to be inspected for evidence of inflammation or malformation.

A most careful study of the urine should be done. The specimen may be obtained through a very small soft rubber catheter after the vulva or glans has been cleaned with green soap and water. A portion of the urine is allowed to flow into a sterile glass tube for culture, since identity of the offending organism is necessary in prescribing the proper urinary antiseptic in later treatment. The larger portion of the specimen is obtained in a clean glass beaker for routine urinalysis. The microscopic examination which includes the staining of the urinary sediment is particularly important and quite often indifferently done in many laboratories: hence a description of the procedure.

The urine is centrifuged for at least 15 minutes at 3,200 revolutions per minute. The supernatant fluid is poured from the centrifuge tube and the sediment transferred to a clean microscope slide and covered with a standard cover glass. With the slide under the microscope the presence of pus or red blood cells is noted and an estimation made of the number in each high power field. Casts may be seen as well as various types of urinary crystals and bacteria. The

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cover glass is then removed from the microscope slide and the sediment allowed to dry. The sediment is fixed by passing it rapidly through the flame several times. After cooling, it is stained carefully by Gram's method and the smear examined under the oil immersion lens. The presence of micro-organisms, their staining reaction and morphology are noted. A negative Gram stain in the presence of microscopic pus should suggest the possibility of tuberculosis and acid-fast stains should be made on the centrifuged sediment and studied under the oil immersion lens for at least one hour unless the suspected organism is found earlier. Guinea pig inoculations should be done on all suspected tuberculous urines.

A notion of renal function is desirable. This may be obtained by measuring the ability of the kidney to excrete a dye or by determining the nonprotein nitrogen concentration of the blood. As a matter of practice, I determine the fasting blood urea and at the time of cystoscopy phenolsulphonphthalein or indigo carmine may be employed as differential tests of function. It must be remembered, however, that a general anesthetic impairs the excretory ability of the kidney. In older children urines of low specific gravity should be further checked with dilution and concentration tests.

Radiographs are as necessary in studying a child with a suspected lesion of the urinary tract as in an adult. A preliminary radiograph of the kidney, ureteral, and bladder regions is observed for the size and position of the renal outline, shadows within the kidney, ureteral or bladder areas; clearness of the outline of the psoas muscle and evidence of spina bifida of the lumbar and sacral vertebrae.

A cystogram may be made by injecting a radiopaque solution into the bladder and this is conveniently done after the urine specimen has been collected. With a good cystogram, anteroposterior and oblique lateral views, diverticula are clearly defined. Filling defects, and reflux to one or both kidneys may be noted. The character of the bladder outline may suggest infravesical obstruction or impairment of the nerve supply, the so-called neuromuscular bladder.

Excretory urograms are very helpful. The dye may be injected in the vein or given subcutaneously after the method of Nesbit and Douglas,[1] while Adams and Hunt[2] employ the intramuscular route. With proper preparation of the patient excellent visualization of one or both kidneys may be obtained. In the event that one kidney visualizes satisfactorily and the other kidney is only faintly visualized good evidence is obtained of an impairment of function of the latter, and at cystoscopy only one retrograde pyelogram will be necessary. Excretory urograms are quite valuable in detecting developmental errors of the upper urinary tract.

With the information obtained from the history, physical examination, urinary findings, tests and renal function, cystogram and excretory urograms properly recorded and studied, much has been done toward the completion of the urologic investigation.

Cystoscopic examinations in children may be done with less trauma or reaction than is experienced in adults. Miniature cystoscopes are available which permit first-class visualization, and some of these instruments are suitable for transurethral surgery. A general anesthetic is necessary for satisfactory examination in younger children and drop ether may be safely employed. In females past the age of 6, a local anesthetic will occasionally suffice; however, the choice of an anesthetic cannot be governed by rule of thumb. After the cystoscope has been carefully passed, the obturator is withdrawn and any urine present collected. Assuming that the child has voided before being placed on the cystoscopic table, any urine found in the bladder may be regarded as residual bladder urine. The bladder mucosa is inspected for abnormalities and each ureteral orifice is watched for spurts of urine. The bladder neck is carefully observed for evidence of contracture or other abnormalities; while in the posterior urethra granulation tissue, hypertrophy of the verumontanum, or congenital valves are some of the more common findings. Certain valvular obstructions may be overlooked with the water continuously flowing through the cystoscope. A catheter may be passed to each renal pelvis and separate specimens of urine collected for microscopic examination, differential function and retrograde pyelograms.

Meredith Campbell[3] and others have found chronic pyurias and obstructive lesions of the urinary tract to be closely associated, and obstruction at the ureteropelvic juncture, ureteral stricture, stone in the kidney, ureter or bladder, ureterocele, vesical diverticula and bladder neck obstructions are some of the lesions encountered. Campbell[3] has illustrated all of the etiologic factors to be considered in chronic pyurias as shown in the following diagram (*Fig. 1*).

The following cases are reported to demon-

strate some of the problems of diagnosis and treatment:

Case 1.—R. D., a boy of 4, was first seen November 23, 1938, at which time the parents stated that at 6 weeks of age the attending physician discovered pus and albumin in the child's urine and that since that date a large number of drugs had been employed orally in an attempt to sterilize the urine.

On examination the boy was found to be well developed, and he was mentally alert. The voided urine contained albumin 1+ and pus 4+. Gram stain of the centrifuged urine sediment showed innumerable gram-negative rods. The blood Wassermann gave negative results and the blood urea was 45 mg. per 100 c. c. of blood; the hemoglobin was 74 per cent with 4,310,000 erythrocytes and 14,100 leukocytes per cu. mm. of blood. A residual bladder urine of 180 c. c. was obtained. The kidney-ureter-bladder picture was negative and excretory urograms failed to visualize after 60 minutes had elapsed.

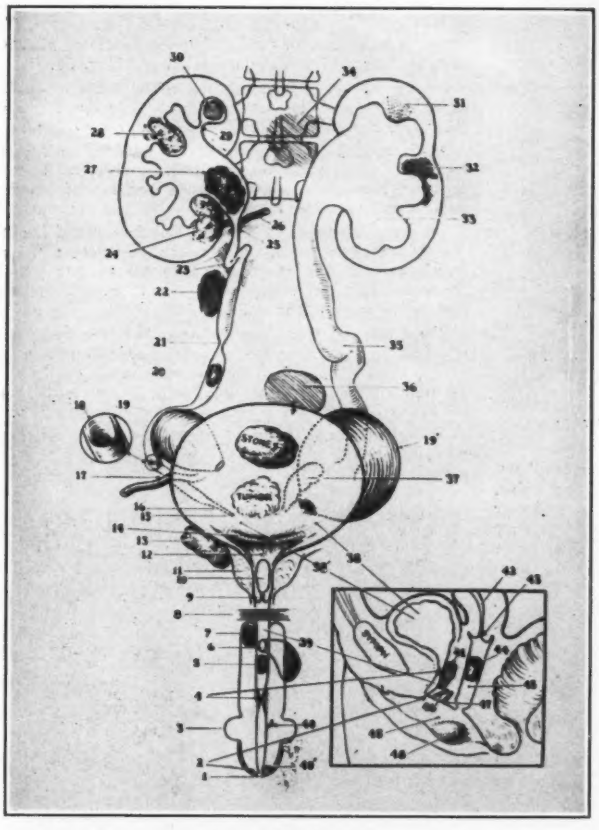

Fig. 1

Causes (direct and indirect) of pyuria: (1) stenosis of prepuce; (2) stenosis of urethral meatus; (3) paraphimosis; (4) urethral stricture; (5) urethral stone; (6) urethral diverticulum; (7) periurethritis; periurethral abscess; (8) cowperitis; chronic external sphincterospasm; (9) congenital valves of posterior urethra; (10) hypertrophy of verumontanum; verumontanitis; (11) prostatitis; prostatic abscess; (12) contracted bladder neck; median bar; (13) periprostatitis or pelvic suppuration; (14) mucosal fold at bladder outlet; trigonal curtain; (15) stricture of ureteral meatus; ureterocele; (16) ureterovesical junction stricture; (17) vascular obstruction of lower ureter; (18) congenital ureteral valves; (19) ureteral obstruction by diverticulum compression; (19′) diverticulum; (20) ureteral stone; (21) ureteral stricture; (22) periureteritis; periureteral phlegmon or abscess; (23) ureteral kink; periureteral fibrous bands; (24) renal tumor; (25) ureteropelvic junction stricture; (26) aberrant vessel (obstruction of upper ureter); (27) pelvic stone; (28) renal tuberculosis; (29) stricture of calyceal outlet; (30) calyceal stone; (31) pyelonephritis; (32) pyonephrosis; (33) "pyelitis;" infected hydronephrosis; (34) perirenal suppuration invading urinary tract; spinal disease (Pott's, etc.); (35) hydro-ureter; (36) pericystic abscess rupturing into bladder; (37) seminal vesiculitis; (38) neuromuscular vesical disease; (38′) cystitis; (39) urethritis; (40) folliculitis (Littre); (40′) folliculitis (Morgagni); (41) periurethritis; periurethral abscess; (42) endometritis; (43) cervicitis; (44) foreign body in vagina; (45) vaginitis; (46) skenitis; (47) folliculitis of introitus; (48) bartholinitis. (Courtesy of The Macmillan Company.)

On January 4, 1939, the veru was electrocoagulated. Three months later 40 c. c. of residual bladder urine was obtained and the blood urea had dropped to 30 mg. per 100 c. c. of blood. At this time the voided urine contained 20-30 pus cells per high power field. Urinary antiseptics by mouth were prescribed intermittently and nine months later only an occasional pus cell was to be found in the voided urine.

Cystoscopic examination revealed a large trabeculated bladder with a tremendous hypertrophy of the verumontanum. Pyelograms were made which revealed a bilateral megalo-ureter and hydronephrosis (*Fig. 2*). A barium enema showed no evidence of an abnormal colon.

Case 2.—S. P., a white girl, aged 6, was seen on January 31, 1938. The mother stated that during infancy the child soiled many diapers with small amounts of urine. As she became older it was noticed that her underclothes were wet with urine during the day and the bed was quite wet during the night. No particular attention was attached to these difficulties, as the mother seemed to believe that this was a natural state of childhood.

A few weeks before the child was brought to me she had been entered in the public school. The school authorities noticed that the child's seat was always wet and that her clothes were, of course, soiled. The odor around the child was so objectionable that the school authorities advised the mother to seek medical attention, as they would be unable to permit the child to continue in school.

A radiogram of the kidney and bladder areas was made and no abnormalities were noted.

Fig. 2
Bilateral hydronephrosis and hydro-ureter

Cystoscopy, with drop ether, revealed a trabeculated bladder which contained a large amount of foul urine. The anterior and posterior lip of the internal sphincter showed tremendous hypertrophy. The expulsive force of the bladder was normal and the mucous membrane showed a chronic diffuse cystitis. A diagnosis of hypertrophy of the anterior and posterior lip of the internal sphincter was made. Excision of the obstructing tissue in the bladder neck was advised, but the parents refused this advice and sought aid elsewhere.

Case 3.—J. W. G., a boy of 14, was first seen in January, 1939, complaining of an occasional ache in the region of the right kidney. Pus had been found in the urine at the age of 2 and many subsequent examinations of the urine had always revealed the presence of a moderate amount of pus.

Physical examination was negative other than for the presence of slight tenderness in the right costovertebral angle. The voided urine contained albumin 4+ and pus 4+ and a Gram stain on the centrifuged urine sediment showed innumerable gram-negative rods. One hundred forty c. c. of residual bladder urine was obtained.

The blood picture presented no abnormalities; the blood urea was 38 mg. per 100 c. c. of blood and the blood Wassermann was negative.

Excretory urograms showed excellent function of the left kidney with slight dilatation of the pelvis and calices. The right renal pelvis and calices contained only very faint traces of medium after 50 minutes had elapsed.

Cystoscopy, with a local anesthetic, was performed and a contracture of the bladder neck noted. The right ureteral orifice was gaping and the entire bladder mucosa subacutely and diffusely inflamed. Indigo carmine appeared in the left ureteral orifice in good concentration in five minutes' time, whereas it was returned through the right ureteral orifice only in traces after 15 minutes had elapsed. A No. 5 F. catheter met a partial obstruction 8 cm. above the right ureteral orifice. A specimen of urine was collected from the right kidney for microscopic study and guinea pig inoculation. A retrograde pyelogram was made, which showed dilatation of the pelvis and calices with suggestive obstruction at the ureteropelvic juncture. The ureter was incompletely filled, but demonstrated elongation, kinking and dilatation throughout (*Fig. 3*).

On culture, *E. coli* was found in the urine from the right kidney, and the results of the guinea pig inoculation were reported as negative at a later date.

A diagnosis of contracture of the bladder neck with 140 c. c. of residual bladder urine and right hydronephrosis was made. Transurethral excision of bladder neck obstruction was advised.

On June 16, 1939, with a low spinal anesthetic of 80 mg. of procaine hydrochloride, the obstructing tissue, which weighed 1.5 grams, was removed with the small Braasch-Bumpus resectoscope. A No. 20 F. catheter was tied in the urethra for drainage.

The postoperative convalescence was entirely uneventful and the retention catheter was removed in 48 hours. The patient was able to void satisfactorily and no residual bladder urine was found. During the following month the urine became sterile spontaneously.

The microscopic examination of the tissue removed revealed smooth muscle tissue with nests of glands in some areas.

Fig. 3
Right retrograde pyelogram demonstrating dilatation of the pelvis and calices. The ureter is dilated and elongated. The bladder is incompletely filled, but multiple cellules are demonstrated.

Gradual dilatation of the right ureter was instituted two months later and the process continued until a No. 12 F. bulb could be passed. A pyelogram made on October 9, 1939, showed some reduction in the size of the pelvis and calices.

Case 4.—D. H., a white girl, aged 26 months, was referred for examination with a history of recurring attacks of pyuria with marked temperature elevation at regular three-week intervals during the preceding five months. With each episode, large amounts of pus had been discovered in the urine and the treatment had consisted of one of the sulfonamides by mouth.

On examination, the kidneys were not palpable nor were masses present in the abdomen. A catheterized specimen of urine was entirely negative to routine examination, but a large number of gram-negative rods were demonstrated by Gram stain. The blood urea was 22 mg. per 100 c. c. of blood.

A radiogram of the kidney, ureteral and bladder areas was interpreted as negative. Excretory urograms were made and the visualization was too fragmentary to be diagnostic.

Cystoscopic examination with drop ether revealed a fullness of the bladder neck with a few areas of granulation tissue at 5:00 and 7:00 o'clock. Each ureteral orifice was slightly gaping. A No. 4 catheter was passed to each renal pelvis and specimens of urine were obtained for microscopic examination and retrograde pyelograms were made. The culture of the urine specimen from the right kidney and bladder revealed *E. coli*. The left retrograde pyelogram revealed a bifid type of pelvis with no dilatation, although the major calices were slightly dilated (*Fig. 4-b*). The right retrograde pyelogram showed slight dilatation of the pelvis, calices and ureter throughout (*Fig. 4-b*).

A diagnosis of chronic right pyelonephritis, chronic bacilluria and chronic granular urethritis was made.

Small doses of sulfanilamide were prescribed and the urine was sterile on the fourth day. The urethra has been subsequently dilated through No. 12 F. and the child has had no further difficulty with her urinary tract.

Case 5.—A. D. S., a white girl, aged 14 months, was referred for simmple cystoscopic examination by Dr. May Agnes Hopkins. During the preceding few weeks the child had developed a marked frequency of urination with crying. Pus had been found in the urine by Dr. Hopkins and urinary antiseptics were prescribed, which resulted in a negative urine. However, the frequency of urination persisted.

Physical examination was entirely negative. A catheterized specimen of urine was obtained, which was negative to routine analysis; however, gram-positive cocci were found on stain of the centrifuged sediment.

Cystoscopic examination revealed a small external urethral meatus which required dilatation with bougies before the No. 9 F. sheath could be passed. Forty c. c. of residual bladder urine were obtained. A moderate amount of granulation tissue was noted in the sphincter between 3:00 and 9:00 o'clock.

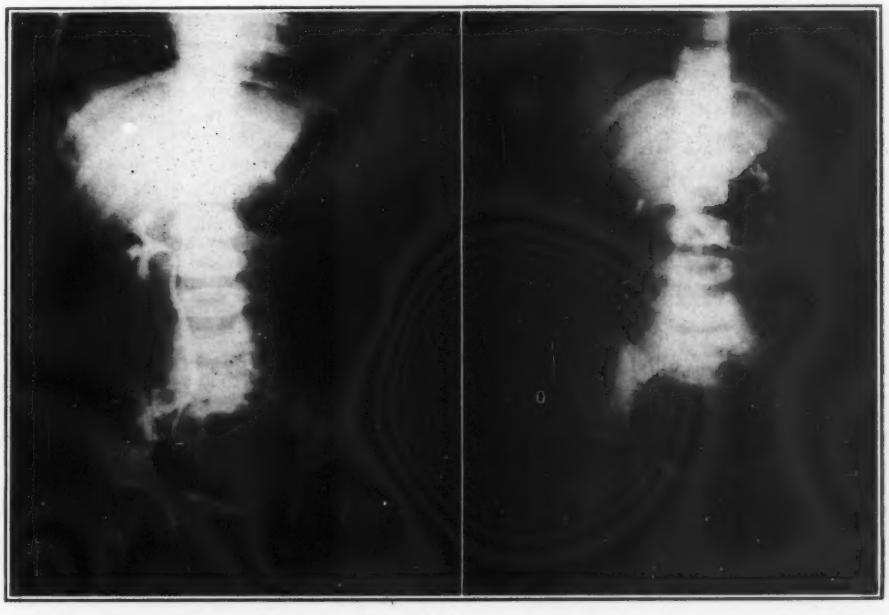

Fig. 4

(a) Right retrograde pyelogram demonstrating early dilatation of the calices, pelvis and ureter throughout.

(b) Left retrograde pyelogram showing bifid type of pelvis. The tips of the major calices are pointing anteriorly. The ureter shows no dilatation.

A diagnosis of chronic granular urethritis with stenosis of the external urethral meatus was made. Further dilatation of the urethra in fourteen days was advised. The child did not manifest any discomfort following cystoscopy and the parents were not troubled with a large number of soiled underpants and diapers. With this improvement the child was not returned for further treatment at the time suggested. Eight months later the child was seen again. At this time the mother said that she had had no urinary difficulties for approximately seven months after my first examination and dilatation. A specimen of urine at this time was entirely negative. The urethra was dilated with bougies through No. 12 F., with marked improvement and the urine has remained sterile.

Case 6.—M. A. F., a white girl, aged 37 months, was first seen February 28, 1940. In September, 1938, the child had been seriously ill with an attack of acute pyelonephritis with a temperature range of 101-107° F., and at this time she received three blood transfusions. During the preceding 12 months she had suffered several recurrences of the acute infection. During the previous month, pus had been found in the urine on repeated examinations and the child strained on urination.

General physical examination was negative. The catheterized urine specimen revealed the presence of innumerable gram-negative rods. The urine culture identified the organism as *E. coli*.

A kidney-ureter-bladder picture was negative. Excretory urograms revealed good function of each kidney with slight dilatation of the pelves and calices. The bladder outline was normal.

Cystoscopic examination revealed hypertrophy of the internal vesical sphincter with 60 c. c. of residual bladder urine. The bladder neck and urethra were dilated with bougies through No. 12 F.

Sulfanilamide was prescribed and the urine was sterile on the fourth day of treatment. The mother reported that the child was able to urinate with no apparent effort. There has been no recurrence of urinary difficulties for eight months.

COMMENT

The first three cases, although previously reported, illustrate three interesting obstructive lesions.

The first patient, a boy of 4, was found to have a very large verumontanum with far advanced hydronephrosis and hydro-ureters. Since early infancy it was known by his parents that pus and albumin were present in the urine. Had adequate measures been taken at an earlier date it is very likely that the process could have been arrested, leaving the child with a better outlook for the future.

The second patient, a girl of 6, was observed to have incontinence of urine both day and night and, for some strange reason, her mother was not disturbed by this condition. Marked hypertrophy of the internal vesical sphincter was noted on cystoscopic examination and a large amount of foul residual bladder urine was present. Excision of the obstructing tissue was advised.

The third patient, a boy of 14, was known to have had pus in his urine since the age of 2, and pus and albumin were found on examination of the urine. No attempt had ever been made to investigate his urinary tract. The right kidney was found to be of diminished function and considerable dilatation of the pelvis and ureter was noted. Had the contracture in the bladder neck been discovered at an earlier age, the right kidney would not have been jeopardized. At the present time, he has a sterile urine and, although I have been unable to obtain recent pyelographic evidence, I am of the opinion that his right kidney has increased in function.

The fourth patient, a white girl of 26 months, was examined because of a history of recurring attacks of pyuria. It is interesting to note that no pus cells were found in the catheterized urine specimen, although a large number of gram-negative rods were demonstrated. Pyelographic studies indicated a right pyelonephritis. With urethral dilatations and the use of a suitable urinary antiseptic, the urine was rendered sterile.

In the fifth patient, a white girl of 14 months, who had frequent and painful urinations, 40 c. c. of residual bladder urine was obtained. Cystoscopic examination revealed a very small external urethral meatus which required dilatation before the small cystoscope could be passed. It is interesting to note that the child obtained considerable relief from simple dilatation alone. It is very difficult to demonstrate early contracture of the bladder neck in a child of this age, and it is possible that this condition was present before the dilatations.

The sixth patient, a white girl of 37 months, was examined for recurring attacks of acute pyelonephritis with marked temperature elevation. Again, it is interesting to note that gram-negative rods were present with no pus found in the catheterized urine. Sixty c. c. of residual bladder urine was obtained and a definite hypertrophy of the internal vesical sphincter was noted. Sulfanilamide promptly sterilized the urine and simple urethral dilatations have relieved the child of straining on urination.

SUMMARY

Chronic urinary infections in children have been briefly considered. Methods found to be useful in the urologic examination have been outlined and the possible etiologic factors de-

scribed. Six cases are reported to illustrate some of the diagnostic problems, the lesions discovered and the treatment employed.

CONCLUSIONS

(1) Urologic examination is indicated in all chronic or recurring infections of the urinary tract.

(2) Obstructive lesions, which are closely associated with chronic or recurring infections, are to be removed with appropriate surgical or urologic methods of treatment.

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Papers of Dr. Ashby and Dr. Pace are two of four papers composing a Symposium on Pediatric Urology. The other two, "Enuresis" by Dr. May Agness Hopkins and "Urological Aspects of Enuresis" by Dr. Harry M. Spence, with the discussion on the Symposium, will appear in a later issue of the JOURNAL.

THE CHOICE OF OPERATION IN PROSTATIC OBSTRUCTION*

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The advances in the specialty of urology are apparent to all who read the history of medicine and surgery. Not the least of these is the lowering of the mortality rate in the surgical treatment of prostatic obstruction. This improvement has come as the result of a wider knowledge and appreciation of certain related vital functions that are disturbed and inhibited by obstruction and infection in the urinary tract and are improved and restored by preoperative drainage and good postoperative care. The chief concern of surgeons who operated for prostatism a generation ago, when the mortality rate was from fifty to seventy-five per cent, was to make the operation safer for those unfortunates who were compelled to submit to prostatic surgery. How well this has been accomplished and how much less risk there is today, is well known. It remains now to supplement these gains by lowering the morbidity rate, thereby insuring better postoperative function, a longer average span of life after the operation and happier patients. It is only by striving constantly to improve operative technic and by attending to the details of pre- and postoperative care, that these desirable results after prostatic surgery can be attained. It is our belief that the selection of the operation best suited for the particular patient's needs, is one of the most important steps in the cure of prostatism and that it is along this line that progress is sure to be made in the future. For a number of years we have attempted to apply this principle to every case of prostatism coming to operation, evaluating and classifying the type and degree of obstruction as accurately as possible and trying to choose the operation best suited for each individual patient. In order to carry out this selective plan of surgical treatment, it is necessary, of course, to become proficient in suprapubic prostatectomy, perineal prostatectomy (including the radical operation for malignancy) and transurethral resection. It is now our firm conviction that the urologic surgeon must be able to do skillfully all of these operations if his patients are to receive the best type of surgical care.

It has been the custom for the surgeon to do the operation that he felt gave the best results in his hands, usually measured entirely by the mortality rate; and there are many who will contend that this should continue to be the policy adopted. The result of this adherence to one operation has been that the patient was being fitted to the operation, rather than the operation to the patient, thereby failing, according to Henline,[1] to give the best possible surgical care in more than 30 per cent of the cases operated upon. In other words, if a patient with prostatic obstruction happens to consult a surgeon who does only suprapubic operations, he will be certain to get a suprapubic prostatectomy, if he is operated upon, regardless of the degree and type of the obstruction or other important related factors which should always be considered in choosing the operation. While this patient's chances for surviving the operation may not be impaired by selecting a "one-operation surgeon," so to speak, his hopes of getting the best possible functional results may be considerably less than if he could have a different operation that was equally safe, if done by one accustomed to

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*Illustrations, *Figs. 1, 2, 3, 4, 5* and *6*, are from "Surgical Pathology of Prostatic Obstructions" by Dr. Alexander Randall and are used by permission to the essayist from the author and the publisher, Williams & Wilkins Co.

its use. "The surgical method employed," says Henline, "in each patient, should be the one which will adequately remove the obstruction, cause the minimum shock to the patient and interfere least with the normal tissue in approximation to the obstruction and hence leave the patient with the best functional result."

The majority of urologic surgeons today are resecting bars and contractures and the smaller hypertrophies and are enucleating the larger benign prostates by the suprapubic route. Palliative resection in inoperable carcinoma has practically entirely supplanted suprapubic drainage. Fear of unpleasant complications has prevented all but a handful of American surgeons from learning the perineal operation, thereby denying themselves the opportunity to do a surgical enucleation under vision, with complete hemostasis and the chance for effecting a cure in early carcinoma of the prostate. The perineal operation can and should be learned by every one who does prostatic surgery, but it does require training and a knowledge of the anatomy of the perineum.

There are certain general principles to be observed when operating for obstruction to urination due either to contracture and bar formation or benign hypertrophy of the prostate. In the radical perineal operation for carcinoma, the problem is a different one. It is concerned primarily with the extirpation of malignant tissue, which, if not entirely removed will destroy life, although even here, it is possible to leave the patient with good urinary control. Impotence nearly always follows the radical operation.

The most pronounced examples of bladder neck contracture and bar formation occur in conjunction with atrophy of the prostate, the so-called "prostatism sans prostate," in which the glandular elements and the capsule have been largely replaced by fibrous tissue and the muscle fibers entering into the structure of the internal sphincter have undergone a partial or complete fibrosis. This lesion is seen more often in men younger than those subject to an obstructive hypertrophy of the gland and is an aftermath of longstanding posterior urethral irritation and catarrhal prostatitis in which the process of round-cell infiltration has been converted into scar tissue, interfering with, or completely inhibiting the function of the internal sphincter and elevating the internal urethral orifice above the level of the floor of the bladder. The effect of this upward retraction of the outlet of the bladder is to help make it impossible for all the urine to come away at the time of voiding and the residual which remains in the portion of the bladder

Fig. 1
Median bar (after Randall)

Fig. 2
Subcervical hypertrophy (after Randall)

below the outlet is irritating and adds to the congestion at the vesical neck and increases the fibrosis. Perhaps not the least of the ill effects of residual urine are the changes that take place in the trigone. Young and Wesson have shown that the function of the trigone is to pull the internal orifice open by contraction of its muscle fibers, permitting urine to enter the urethra. These fibers hypertrophy when there is obstruction at the bladder neck from glandular enlargement or fibrosis, as a consequence of the greater effort required to pull the orifice open. As this hypertrophy progresses, the interureteric ridge, the posterior border of the trigone, becomes elevated and thickened and a pouch forms behind it, to hold the residual urine after operation, if the condition is not recognized and corrected by proper surgery. In exaggerated forms of trigonal hypertrophy, the pouch it forms may be a large portion of the bladder cavity and the movable and elevated trigone may obstruct by prolapsing over the orifice at the time of voiding, even though the enlarged gland or contracted neck, as the case may be, has been well taken care of. The retrograde or retrospective lens gives the best view of this condition. Trigonectomy by the suprapubic route is the surgical procedure of choice, although some operators have attempted its correction by cutting through the trigone with the resectoscope loop. The trigone is highly vascular and the danger of bladder perforation considerable and for these reasons we prefer the open method of trigonectomy.

Bugbee said many years ago that the actual removal of the prostate gland is but an incident in the cure of prostatism, the inference being that of more importance than the enucleation of the adenoma is the proper preoperative and postoperative care of the patient. If one ignores certain rules that have been universally accepted by urologists everywhere, his mortality rate will inevitably be higher than it should. The importance of preoperative drainage to restore the function of damaged kidneys, the significance of the various functional tests, the blood chemistry findings and electrocardiograms, the relation of the fluid intake to the output of urine, the mental condition of the patient and the signs of impending uremia, the presence or absence of other bladder disease, such as stones, diverticula, and tumors, the association of prostatism with other disease, such as diabetes, cardiorenal-vascular disease, arteriosclerosis and syphilis, are all factors that have to do with determining the number of patients who survive the operation and the number who die.

Of almost as much importance to the patient as surviving the operation is the question of whether or not he gets a good functional result and we believe that with many operators the

Fig. 3
Solitary commissural hypertrophy (after Randall)

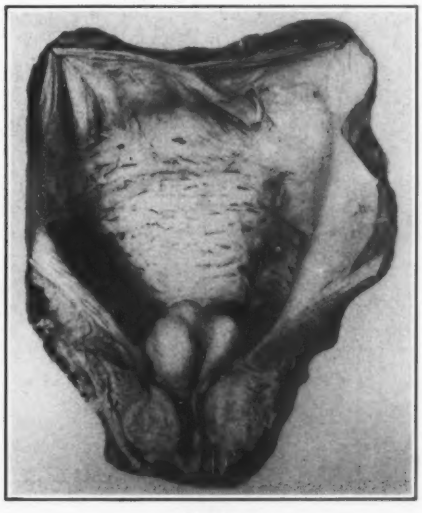

Fig. 4
Subcervical and lateral lobe hypertrophy (after Randall)

actual removal of the gland is considered too much of an incident and that certain things that should be done to insure good function are sacrificed on the altar of speed or are neglected because their importance is not appreciated. Many postoperative dribblers had rather be dead and the genito-urinary surgeon's responsibility is only half met when he observes the rules that keep down his mortality rate. What then should be the ideal functional result after operation? An operation for benign bladder neck obstruction, by whatever method done, should leave the patient continent, his bladder should completely empty, or at the worst, carry not more than an ounce of residual urine. His urine should be clear and he should be able to void freely and easily and while voiding have the power to start and stop the stream at will. In order to secure these desirable results after operation, we must leave the floor of the urethra approximately level with the floor of the bladder. The sphincters, especially the external one, must be intact and functioning. The prostatic capsule must be free of plaques and isolated adenomata and there must be no tags of capsule left to prolapse into the neck of the bladder to obstruct or interfere with proper closure. There must be no shelving or undermining of the trigone to form a reservoir for urine which will become infected and foul, nor should a markedly hypertrophied trigone be left behind to form a pouch for residual or to obstruct by prolapsing over the outlet. Diverticula, tumors and stones must have received attention if present. In other words, the toilet of the bladder must be made before the job is complete, regardless of what type of obstruction brought the patient to operation. Following the operation the patient should be kept under observation until the urine is free of infection. Lavages, irrigations and appropriate chemotherapy will sterilize the urine if the obstructing tissue has been removed.

A careful study with the fore-oblique, the right angle and the retrograde lenses, when cystoscopy is not contraindicated, together with cystograms, urethrograms, rectal palpation and estimation of the residual urine present, are the methods employed in determining the degree and type of obstruction. Aerocystograms and urethrograms as described by Henline, Alcock and others, give diagnostic information that is often sufficient to determine the need for surgical relief and suggest the type of obstruction, but rarely in our experience, except in cases of acute retention with impassable obstruction, have we failed to do a cystoscopic study before deciding on the operation to be employed.

Randall's[2] classical study of 1215 autopsies at the Philadelphia General Hospital has been of great value in our attempts to choose the most suitable operation for the relief of prostatism.

Fig. 5
Commissural and lateral lobe (trilobar) hypertrophy (after Randell)

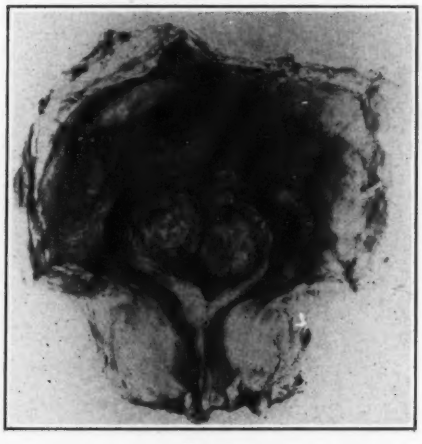

Fig. 6
Large lateral and subcervical hypertrophy (after Randall)

He found obstructing lesions at the bladder neck in 312, or 25.6 per cent, divided as follows:

	No.	Per Cent
Benign hypertrophy	222	71.1
Bars and contractures	57	18.2
Carcinoma (13 with metastases)	17	5.4
Prostatic abscess	16	5.1

It is in the benign hypertrophies that one must exercise the sharpest discrimination in choosing the operation if the best results are to be obtained, for the indications are not so clear cut as in the other three groups.

Randall's division of the benign hypertrophies into eight types has been followed in our work since the publication of the results of his study. We recommend it to anyone interested in this subject. We are inclined in our study further to classify the types he mentions into large and small, in arriving at a decision as to what operation is indicated. He lists the following:

(1) Simple bilateral lobe hypertrophy
(2) Solitary posterior commissural hypertrophy
(3) Bilateral and commissural hypertrophy
(4) Solitary subcervical lobe hypertrophy
(5) Bilateral and subcervical lobe hypertrophy
(6) Bilateral, subcervical and commissural hypertrophy
(7) Anterior (commissural) lobe hypertrophy
(8) Subtrigonal lobe hypertrophy

In choosing the operation we first take into account the following facts:

Transurethral Resection.—This is ideal for bars and contractures. The smaller posterior commissural and subcervical hypertrophies, without lateral lobe enlargement, are easily and quickly relieved, and the relief seems to be permanent. Resection of postcommissural hypertrophy with small intra-urethral lateral lobes takes longer, is more prone to have troublesome bleeding, but is ordinarily satisfactorily relieved. The obstruction may recur from relief of tension in the lateral lobes. The larger tri-lobar enlargements should be enucleated.

Postoperative contractures and tags of capsule and isolated adenomata producing faulty closure of the internal orifice or persistent suprapubic fistula, can be relieved by resection.

Transurethral resection is ideal for relieving obstruction due to inoperable carcinoma, provided the instrument can be introduced. It should be repeated when the obstruction recurs.

Prostatic abscess can be drained by opening through the walls of the urethra with the resectoscope but the cavity may not heal and may remain as a diverticulum of the urethra which traps urine and maintains infection.

Small subcervical lobes are satisfactorily resected. Large ones may be very difficult and in our experience have often been incompletely removed.

Suprapubic Prostatectomy.—The one-stage operation, whose sole advantage in our hands was enucleation and bladder neck suture under vision, has been abandoned. The type of case suitable for bladder neck suture in which the adenoma does not project markedly into the

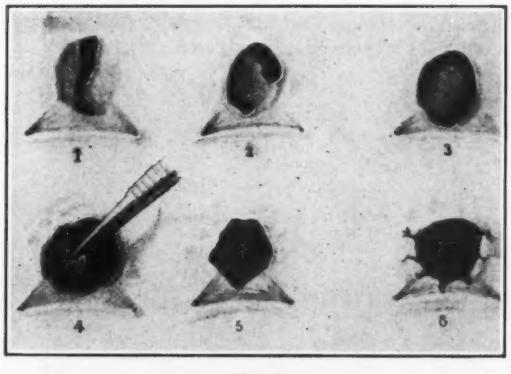

Fig. 7

Thomson-Walker's open prostatectomy: conditions found at second stage. (1) Folds of mucous membrane closing vesicoprostatic opening. (2) Flap of mucous membrane at vesicoprostatic opening. (3) Pedicled adenomatous nodule in prostatic cavity. (4) Thick flap of prostatic capsule, partly detached. (5) Narrow vesicoprostatic opening, wedge cut from posterior tegument. (6) Continuous or interrupted suture of posterior two-thirds of vesicoprostatic opening (after Young)

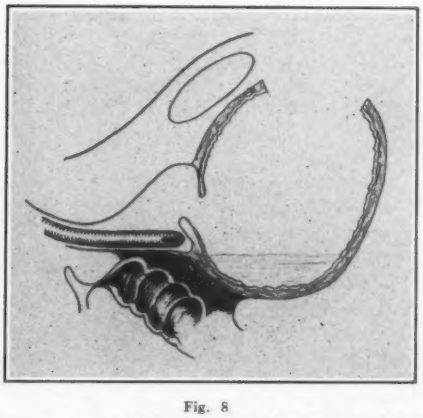

Fig. 8

Common cause of dysfunction and residual after suprapubic prostatectomy.

bladder, can best be done in our hands by the perineal route.

The two-stage suprapubic operation is indicated when tumors, stones, or retention diverticula are present and these should be taken care of in the first stage. Moderately large stones can be removed by the perineal route after enucleating the prostate. We do not advocate resecting the openings of diverticula because of the danger of perforation and extravasation. Large solitary commissural hypertrophies, as pointed out by Randall, always grow upward and intravesically, dilating the internal sphincter and had best be removed suprapubically. Perineal removal is easier if there is lateral lobe enlargement to which the commissural hypertrophy is attached on either side, but as a rule, is not preferable in the larger ones because of the depth of the dissection necessary. Since the internal sphincter is already well dilated and thinned out, suprapubic removal adds little damage to the muscle fibers. The glandular elements from which the postcommissural enlargements develop are inside the prostatic capsule. The enucleation, therefore, should follow carefully the false line of cleavage, close to the capsule.

The combined postcommissural and lateral lobe (tri-lobar) hypertrophies of moderate size are ideally removed by perineal prostatectomy. All the glandular tissue can be detached from the overlying muscular trigone and the fibers of the internal sphincter can be pushed away from the base of the gland before cutting the urethra just distal to the internal orifice. Hinman's incision in the capsule makes it possible to remove this type intact.

The larger tri-lobar hypertrophies with marked intravesical intrusion should be removed suprapubically.

Perineal Prostatectomy.—This method comprises about one-third of our enucleations for benign hypertrophy. Other things being equal and provided the case is suitable for this type of removal we prefer it (a) for the poor risks, (b) for the very old and the feeble, (c) for the patient with a large pendulous abdomen, (d) where there is the slightest suspicion of early carcinoma, (e) for those patients who have previously had a transurethral resection or punch operation of any kind, (f) for patients with prostatic calculi, (g) where a perineal exposure and a biopsy on a suspicious nodule reveals carcinoma that is apparently limited to the capsule. In the latter two a total or subtotal prostatectomy is indicated.

Simple bilateral extra-sphincteric hypertrophy in which the obstruction is due to intra-urethral intrusion is best removed perineally to insure preservation of the internal as well as the external sphincter. Commissural and lateral lobe hypertrophy without marked intravesicle intrusion through the sphincter is suitable for perineal enucleation as mentioned above. Prostatic abscess, as soon as fluctuation is detected or urination interfered with, should be drained perineally by exposing the under surface of the gland and making vertical, parallel, lateral incisions, one on either side of the urethra through the capsule and into the substance of the prostate, following which small rubber tissue drains are introduced into the abscess cavity and held in

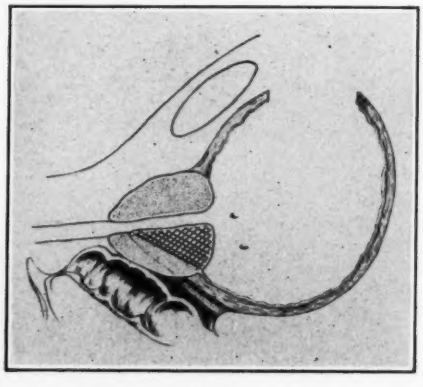

Fig. 9
Shaded portion of gland to be removed with punch immediately prior to enucleation.

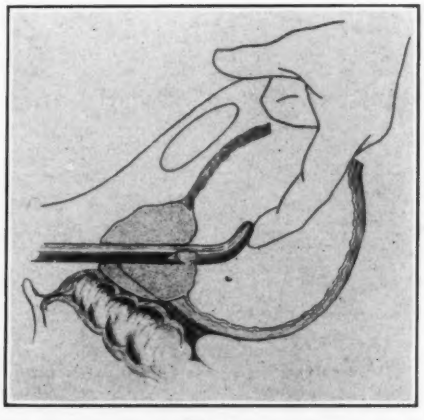

Fig. 10
Preliminary punch before enucleation. Several bites usually necessary.

Fig. 11
After punching and enucleation.

place by a single stitch through the edge of the incision in the capsule.

Prostatotomy by the perineal route has been advocated by Mathé and others before fluctuation can be detected in acute parenchymatous prostatitis but we are not in accord with this view. Many abscesses can be aborted by appropriate treatment.

We are firmly convinced that there is less shock and a smoother, quicker convalescence with a slightly lower mortality from the perineal operation as compared with the suprapubic. The dreaded complications of incontinence, rectourethral fistula, and persistent perineal fistula should not occur if the dissection and anastomosis are skillfully done. Many patients with severe myocardial damage who require surgery for the relief of prostatic obstruction can be carried through a perineal enucleation under parasacral anesthesia when a suprapubic operation would probably prove fatal. In fact, we consider it potentially less dangerous under these circumstances than a transurethral resection with that operation's risk of hemorrhage and infection. An obstructed catheter and a bladder distended with clots with the turmoil and discomfort incident to evacuating the clots and controlling the bleeding and the possibility of ultimately having to do an emergency cystotomy with packing, or a bag, or enucleation to control the persistent hemorrhage, and possible transfusion, as has occurred to all of us who have done any number of transurethral resections, is more shocking and disturbing to an individual with an old coronary than is a smoothly performed perineal prostatectomy under satisfactory basal and transsacral anesthesia. What is more important, in the perineal all the obstructing tissue is removed, hemorrhage is controlled under vision and the patient stands an excellent chance to make a satisfactory recovery requiring a minimum of postoperative care.

SUMMARY

(1) There are indications for all the operations for the relief of prostatic obstruction. These indications overlap it is true, but with more experience and closer study to determine the type and degree of the obstruction preoperatively, the choice of operation can be made more definitely.

(2) There is a slight difference in the mortality rate in favor of the perineal operation over the suprapubic. In experienced hands, transurethral resection is probably the safest of all, but has a high morbidity rate. The postoperative functional results can be improved by choosing the operation best suited to the patient.

(3) Every surgeon operating for prostatic obstruction should be qualified to recognize the various types producing prostatism and should equip himself to do all the operations described above with an equal degree of skill and safety to his patient and satisfaction to himself.

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346 Doctors Building

Discussion follows paper of Dr. Dorman, page 764.

THE TREATMENT OF PROSTATISM BY TRANSURETHRAL RESECTION*

By HORATIO N. DORMAN, M.D., F.A.C.S.
Washington, D. C.

Many of you were present at the Miami meeting of this Section in 1929 when Dr. T. M. Davis[1] presented a paper covering his earlier work on this subject. The tremendous interest shown in resection during the past ten years stands as a living monument to the ingenuity and skill of Dr. Davis, who is largely responsible for the important position which resection holds in sur-

*Read in Section on Urology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

gery of the prostate gland today. After improving the instruments of that time, Dr. Davis proved that sufficient tissue could be safely removed transurethrally to produce good functional results. I feel it a distinct honor to have a place on this program with the opportunity to discuss my experiences in the treatment of prostatism by resection.

My remarks are based upon a study of 389 resections performed on 325 patients. I make no apology for reporting this small number of cases. I feel that a great deal of useful and valuable information can be obtained by a careful analysis of this number of cases that have been examined, diagnosed, prepared for operation, operated upon, and then cared for until well, under a uniform regime, by one surgeon.

Dr. Duncan has discussed the signs, symptoms and diagnosis of prostatic obstruction. I wish to discuss some of the more controversial questions which arise relative to the selection of cases, anesthesia, pre- and postoperative care of the patient, as well as the technic of resection, final results and mortality.

SELECTION OF CASES

There has been considerable discussion, especially among those not particularly adept at resection, about the types of obstruction which should be resected. Most urologists agree that median bars, contractures, the smaller middle lobes, and certain small intraurethral lobes should be resected, also advanced carcinomas. A few go so far as to say that all obstructions should be resected, assuming, of course, that the resectoscope can be passed. Our records show that 85 per cent of all cases of obstruction coming under our care during the past eight years have been treated by resection. Some cases were prostatectomized on account of the size of the gland, some for other reasons. It is our practice, at present, to resect all except the very largest intravesical obstructions, which markedly increase the urethral length. We have never attempted a resection through a suprapubic or external urethrotomy incision. In reality, the selection of cases suitable for resection depends almost entirely upon one's attitude toward resection and his ability to perform a complete operation by this method.

ANESTHESIA

We find caudal and transsacral block anesthesia to be the most desirable for this work. Anesthesia is obtained by injecting from 30 to 60 c. c. of a 1 per cent solution of procaine hydrochloride into the caudal canal; 9 or 10 c. c. is injected into the second sacral foramena; 8 c. c. into the third; and 7 c. c. into the fourth on each side. Premedication to the drowsy level is desirable.

Table 1

TYPE OF ANESTHESIA (325 CASES)

	Cases	Per Cent
Transsacral	275	84.6
Transsacral and gas	9	2.7
Spinal	33	10.1
Tribromethyl alcohol	7	2.1
Gas	1	0.3

Table 1 shows that 84 per cent of our first 325 cases were done under this type of anesthesia. The greater margin of safety, the freedom from undesirable postoperative complications, and the lack of disturbance to blood pressure make this anesthetic ideal for prostatic resection.

EQUIPMENT USED

During the past ten years, when resection has really made an enviable position for itself in surgery of the prostate gland, there have been developed two standardized methods for the removal of tissue, to wit: (1) The so-called cold cutting method, which is a refinement of the Young punch; (2) the electrical method with a wire loop, which developed from the Stern resectoscope. These two methods of removing tissue need no elucidation from us. Suffice it to say that either method is effectual in properly trained hands. And may we add that proper training is the essential factor in this, as in all highly specialized operations.

After examining the different generators on the market, we decided that the Davis-Bovie machine combined the features of efficiency, ease of manipulation, and safety better than any other. The high frequency current developed in this generator is well adapted for both cutting and coagulation. The dual footswitch adds to the speed and ease with which each current may be applied. Bleeding is always a factor to be reckoned with during resection. Some glands bleed more freely than others. The cutting current in this machine can be adjusted for light or deep coagulation, so that more freely bleeding glands can be controlled, as well as those with less tendency to hemorrhage. Hemorrhage can also be regulated, to a great extent, by the

speed with which the loop passes through the tissue. In the more actively bleeding glands we make the sections more slowly, and in this way often eliminate the use of the coagulating current entirely. This technic is applicable only to the electrically enervated loops, and is one reason for their superiority.

The various resectoscopes on the market today fall into two classes, the non-fenestrated type and the fenestrated type. The fenestrated type was developed first, and was used exclusively by the pioneers in this work. We used it in our first 60 cases. Since that time we have used the non-fenestrated instrument exclusively, and find it superior in many respects, namely:

(1) Vision is much better, giving one a more accurate view of the entire field and its relationships. This makes each resection more accurate and precise.

(2) Resection is more speedily accomplished on account of the larger field of vision and the fact that larger and longer pieces of tissue can be removed with each section.

(3) Resection is more easily accomplished. The one working element does the cutting and coagulating without making any change. The resected pieces drop out of the field more easily, and can be removed more readily.

(4) Finally, it is much more easily adaptable to the great variety of obstructions found, both in the urethra and at the vesical outlet.

PRELIMINARY TREATMENT

Proper preliminary treatment changed prostatectomy from a dangerous operation to one of comparative safety. Our experience with resection convinces us that adequate preparation is no less essential here than with open operation. The amount and character of preliminary treatment must be determined in each individual case by careful examination. Occasionally a man presents himself for resection and we find, on examination, that little or no preparation is needed; but this is the exception rather than the rule. I should like to discuss preliminary treatment under two headings: (1) general and (2) specific considerations (*Table 2*).

GENERAL CONSIDERATIONS

(1) *Diet.*—Many men come for operation who have absolutely no appetite, and who are unable to retain adequate food. These cases require a very intelligent selection and administration of nourishing liquid foods until such time as a regular, balanced diet can be taken. Vitamins are very helpful in building up these debilitated men.

(2) *Fluids.*—It is our aim to have each man take at least 1 gallon of water a day before resection is undertaken. We find that many men get to the point where they take practically no water. Such cases must start with a fair quantity by mouth, and gradually increase the daily amount. In the meantime, fluids are given by vein to maintain the proper intake.

(3) *Elimination.*—Lack of fluids, improper diet, restricted activity, with or without prostatic obstruction, often interfere with free elimination. Adequate elimination must be secured by general measures or laxatives before proceeding with resection. Frequently the bowels will take care of themselves when proper diet and fluids are taken.

(4) *Activity.*—A man's willingness and ambition to be up and about is a fairly good index to his general physical condition. Unless there is a specific contraindication, we like to postpone resection until our patient experiences a general feeling of well-being, and manifests a desire to be doing things.

(5) *Associated Diseases.*—It is not uncommon for our prostatic to be afflicted with one or more associated diseases. We have enumerated some of the more common conditions found in this series. The figures indicate the number of patients suffering with each disease. Attention is directed to the control of the existing disease before resection is undertaken. We do not hesitate to perform a needed resection in the

Table 2

PRELIMINARY TREATMENT

General considerations		
(1) Diet	Lues	13
(2) Fluids	Diabetes	12
(3) Elimination	Heart disease	28
(4) Activity	Hemorrhoids	8
(5) Associated diseases	Herniae	14
	Anemia	17
	Cancer	5
	Hydrocele	6
	Varicocele	2
	Arthritis	3
Specific considerations (urinary)		
(1) Infection		
(2) Drainage		
(3) Kidney function		
(4) Vas deferens	Infections	114
(5) Urethra	Calculi	21
(6) Associated urologic conditions	Diverticula	6
	Tumors	20
	Strictures	8

presence of any of these diseases; but it is wise to get these conditions under the best possible control before resection is performed. This is particularly true in cases of heart disease, diabetes and anemia. Hemorrhoids and herniae are particularly disagreeable complications. It is our practice to do the resection first, and then, with the bladder condition under control, attention should be directed to other surgical conditions.

SPECIFIC CONSIDERATIONS (URINARY)

(1) *Infection.*—We have always had a wholesome respect for the presence of urinary infection when doing prostatic surgery, and to that end have used urinary antiseptics freely before and after operation (*Table 3*). Methenamine and sodium biphosphate are used as a routine in all cases where the urine is acid. A minimum of 45 grains a day is given by mouth. All patients wearing a retention catheter receive a daily intravenous injection of 30 grains of methenamine. Patients with persistently alkaline urine are given pyridium or some other antiseptic. We have never used sulfanilamide or its associated drugs prior to resection. A daily bladder injection of some urinary antiseptic, usually a silver protein, is made through the catheter. We have followed this regime since beginning prostatic resection, and so far have escaped the troublesome complications incident to infection.

Table 3

TREATMENT OF URINARY INFECTIONS

(1) Meth. and sod. biphos., 45-60 grains daily
(2) Intravenous methenamine, 30 grains daily
(3) Pyridium in alkaline urine
(4) Sulfanilamide not used
(5) Silver protein solution injected in bladder daily

(2) *Drainage.*—We are firm believers in adequate preliminary drainage; and this, for the most part, by retention catheter. In *Table 4* you will note that the largest percentage, 45.8, were drained by indwelling catheter; 23.3 per cent were drained by intermittent and retention catheter; and 16 per cent by intermittent catheter only. A total of 85 per cent received catheter drainage. We have never had any untoward complications from the use of a retention catheter when properly cared for. A size 16 or 18 balloon catheter provides the most comfortable and adequate preliminary drainage; it dilates the urethra to some extent; and it gives the patient an opportunity to become accustomed to its presence before operation. In our experience patients who have worn a retention catheter do better at operation and have an easier convalescence than those who have not been so treated. Most cases with 3 or more ounces of residual urine wear a retention catheter for a few days, at least; those with larger residuals are drained a proportionately longer time. Our experience with the use of the indwelling catheter is quite contrary to that reported by Dr. Middleton.[2]

Table 4

PREOPERATIVE DRAINAGE (325 CASES)

	Cases	Per Cent
No drainage	43	13.2
Intermittent catheter	52	16.0
Retention catheter	149	45.8
Intermittent and retention catheter	76	23.3
Cystotomy	5	1.5

(3) *Kidney Function.*—We believe that kidney function, as determined by the phenolsulphonphthalein test and by blood chemistry determinations, is an accurate indication of the patient's ability successfully to undergo operation. *Table 5* shows the results of these tests in our 325 cases. In cases where the function is low resection is deferred until it rises to normal, or, at least, becomes stabilized. Any surgeon who does prostatic surgery before nonprotein nitrogen reaches its lowest level is subjecting his patients to unnecessary and dangerous risks.

Table 5

KIDNEY FUNCTION (325 CASES)

P.S.P., Blood Chemistry

	Cases	Per Cent
Within normal limits	222	68.3
Impaired	76	23.3
No record	27	8.3

(4) *Vas Deferens.*—Our treatment of the vas has changed with the years. At first no attention was paid to it. Then we seemed to have an unusual number of cases of epididymitis, a few of which went on to necrosis of the testicle,[3] so a vasectomy was done for a time on all cases. Some patients object to vasectomy; then, too, it seems unnecessary surgery in many cases. Our practice at the present time is to treat the vas only in men past the age of 70; and then by ligation rather than resection. Epididymitis may not be any more common in these older men, but it is certainly more devastating when

it does occur. In our last hundred cases there has been no case of epididymitis in untreated cases.

In vas ligation, after the parts are cleansed, the vas is located in the upper portion of the scrotum and grasped with a Squire clamp. Local injection of procaine is then made, and a short incision made through the overlying tissues over the vas. A 20-day chromic catgut suture is passed around the vas and securely tied. The skin is closed with plain catgut. These wounds heal without further attention.

(5) *Urethra.*—Careful examination of the urethra should be made early to detect strictures, infection or other abnormality which should be given appropriate treatment before resection is undertaken. Many post-resection complications would be avoided by attention to this detail. Strictures are best dilated by catheters of increasing size. Meatotomy, when necessary, should be done at the time of resection.

(6) *Associated Urologic Conditions.—Table 2* shows the more common conditions found, and the number of cases encountered in this series. Infection is, by far, the most common condition. Its treatment has already been discussed. Vesical calculi are frequently associated with prostatic obstruction. Some calculi can be crushed and removed, either before or after resection. Many small stones may be removed through the resectoscope. Most diverticula are of no clinical significance after the obstructing gland is removed; otherwise they must be treated surgically. So far we have never found this necessary in any resected case. It is not uncommon to find vesical tumors associated with prostatic enlargement. These are treated by transurethral resection, if their location makes this procedure possible. Smaller tumors may be removed at the time the prostate is resected; larger ones may be resected at another time, either before or after the prostate is removed. In a recent case we resected a bleeding tumor first; six weeks later the prostate was resected. Both tumor and prostate were large enough to require a separate sitting for its removal. Pathologic lesions of the upper urinary segment need not be considered here, except to say that any existing lesion must be properly treated in order to insure a complete recovery with absence of symptoms.

TECHNIC OF RESECTION

The patient is made comfortable on the table, with his legs and feet resting on the specially constructed knee crutches. The retention catheter is removed, and the parts cleansed and draped. Sounds are passed, followed by the resectoscope sheath with a soft catheter used as an obturator. The prostate is then carefully palpated per rectum with the resectoscope sheath as a guide. We consider this examination very important. By it an accurate estimation of the amount of tissue to be removed both posteriorly and laterally is obtained. The bladder is then thoroughly irrigated, and careful inspection made with the right angle and foroblique lenses. Personally, I have never obtained any added information by use of the retrograde lens. The location and amount of obstructing gland are carefully observed, and mentally checked with the impression obtained by rectal palpation. The verumontanum is observed, with special reference to the character and position of the lobes about it. Formerly our sections were terminated at the upper level of the verumontanum; but occasionally we have found lateral lobes extending beyond the veru anteriorly, and it becomes necessary to make a few sections in this area to produce the desired results.

The working element is then passed, necessary connections are made; and with the current of water constantly flowing through the sheath resection is begun. It is our practice to remove the obstructing tissue on the floor of the urethra and posterior vesical outlet first. Each section begins on the vesical side of the obstruction, and extends out to the verumontanum, if necessary. The area from 5 to 7 o'clock is sectioned, each piece of tissue being allowed to fall into the bladder until several sections are made, or until the bladder capacity is reached. The working element is then removed, allowing the irrigating fluid to escape with as many pieces of tissue as may do so. The working element is then reinserted, and the procedure repeated until all obstructing tissue in this area is removed. Frequently an over-distended or sacculated bladder will not force all the resected pieces of tissue out with the irrigating fluid. In such cases it becomes necessary to withdraw the tissue from time to time with an Ellik or Stern evacuator. Individual pieces may be picked up with the McCarthy hemostatic forceps. Any actively bleeding vessel which seriously obscures vision is coagulated at once; otherwise coagulation is postponed until the entire area is resected. Often a second section made over a bleeding area will control the bleeding without the application of the coagulating current. It is essential to have a clear field always, and no section should be made unless the surgeon knows the exact loca-

tion of the loop and the tissue it is passing through. The importance of this point cannot be overemphasized. A great many complications have been brought about by sections being made blindly. One of the distinct advantages of the McCarthy resectoscope is the fact that the loop can be guided under direct vision during its entire excursion. Sections adjacent to the verumontanum are best made from before, backward towards the bladder. By this method the loop can be accurately placed on the obstructing tissue, thus avoiding all danger of injury to the external sphincter.

After all obstructing tissue is removed from the floor of the urethra, and all actively bleeding vessels are controlled, we then begin on the right lateral lobe, making our first sections adjacent to those previously made at 7 o'clock, and gradually working around to 9 o'clock, and then to the midline anteriorly. All sections are made from the bladder side of the gland forward. Sectioning should continue until the obstructing lobe is on a level with the bladder wall. Care must be taken to have sufficient water in the bladder at all times to obliterate any folds, lest they be caught in the loop. I wish to emphasize the necessity of extending the sections entirely around to 12 o'clock in the midline so that when the left lobe is resected in a like manner there will be no tissue left projecting into the bladder interiorly. In other words, all obstructing tissue should be removed from the entire circumference of the vesical outlet. This is necessary for the best results, and there is no objection to removing all obstructing tissue. I have read statements by surgeons not expert in resection about the danger of removing tissue from the anterior aspect of the gland. In reality no such danger exists. When sufficient tissue is removed, there will be a smooth, even concavity extending around the right lateral side of the vesical outlet and out to the veru. All bleeding vessels are controlled. Attention is then directed to the left lateral lobe, which is treated in like manner, after which the entire field is examined with foroblique and right angle lenses; and any remaining tags or obstructing tissue removed. Finally, the bladder cavity is explored, and any remaining pieces of tissue are evacuated. All bleeding points are controlled, and the resectoscope removed. If there is any question in one's mind as to whether or not any obstructing tissue remains, rectal palpation with the resectoscope in place will determine this point. We have frequently employed this procedure to good advantage.

We ordinarily use a number 22 catheter with a 5 c. c. balloon attachment for postoperative drainage. In cases where spinal anesthesia is used, we insert a pear-type balloon catheter with a capacity of 75 c. c., and apply traction for a few hours. Following this technic the experienced resectionist should be able to remove about 60 grams of tissue in one hour. This should be sufficient in most cases. The occasional case requiring further resection had better be finished up at a later date, unless he is in exceptionally good physical condition. Experience has shown that the majority of cases coming to resection are cured by the removal of much less than 60 grams of tissue. In our last hundred resections we had an average of 23.43 grams per case. In only 6 cases were more than 50 grams removed. Three of these cases required 2 resections each.

POSTOPERATIVE TREATMENT

Intravenous glucose solution is given as soon as the patient is returned to his room. This is repeated as necessary in case a sufficient quantity of water is not taken by mouth. The catheter is connected to a drainage bottle at the bedside. Postoperative bladder irrigations are carried out as often as necessary to keep the drainage tube clear in case the drainage is bloody; and always 3 times a day. Warm boric acid solution is used in a bulb syringe. After the morning irrigation, an instillation of some urinary antiseptic, usually silvol, is made, and allowed to remain in the bladder 5 minutes before the catheter is again connected to the drainage bottle. Urinary antiseptics by mouth are given as before resection. Soft diet is given on the day of resection, regular diet thereafter.

Most cases go along with little or no fever and no pain. Sedatives are given when necessary to keep each patient comfortable. The most important, single item in the postoperative care of the patient concerns the care of the catheter. It must be kept draining freely at all times. Obstruction caused by pieces of tissue, blood clots or ill-adjusted catheter must be relieved at once; otherwise the patient will be uncomfortable, and a great deal of damage may be done. Intelligent nursing care is essential to detect any irregularity. Proper attention should be given at once, to wit: bladder irrigations, aspiration of clots, or changing the catheter, if necessary, to relieve the situation. When adequate treatment is not given promptly, more drastic measures may be necessary, as cystoscopy, removal of clots and fulguration of any bleeding areas.

Transfusion should be given at once if there are signs of shock from bleeding.

Ordinarily these patients are out of bed on the day following resection, and resume their daily sitz bath. Very old or debilitated patients may require a few extra days in bed. We usually remove the catheter on the fourth or fifth day, and most patients are ready to go home on the following day. This speedy recovery with an absence of complications is partly due, we believe, to the extra care in preoperative preparation, and the fact that resection is postponed until the patient is in the best possible physical condition.

Urinary antiseptics by mouth are continued for at least one weak after the patient leaves the hospital, and longer in cases of persistent infection. When sufficient tissue is removed to enable the patient to empty his bladder completely, there is seldom any trouble in cleaning up any residual infection. When the urine does not clear, one must look for residual urine or some remaining infected glandular tissue. Recently we have used sulfanilamide with good results in the occasional persistent infection.

RESULTS

Our results in prostatic surgery should be determined by:

(1) Immediate relief from symptoms of prostatism;

(2) Permanent relief of these symptoms.

The one vital factor that determines results, both immediate and late, is adequate resection of tissue. The size of the gland or the amount of tissue removed in any case is not of prime importance. Strangely enough, our most difficult problem has been to give symptomatic relief to the patient who has a small, sclerotic gland. This type of gland has always been a difficult problem for the urologist. Until we made a practice of performing an extensive resection, removing all the fibrous tissue present, many of these patients continued to have symptoms. A second resection was often necessary for complete relief. Experience has eliminated this difficulty.

It may be too early to draw conclusions about the permanency of results with only 8 years of experience to draw on. Patients and physicians are demanding a permanent cure by resection, assuming that the results by open operation are all that can be desired. Every urologist knows that this is not the case. We all have an occasional patient who has not been entirely relieved of his symptoms by prostatectomy. Davis[4] reports that 46 of his first 748 cases resected had previously been prostatectomized. Of the 325 cases here reported 7 had previously received a suprapubic prostatectomy. Skill and care in any operation tend to give most satisfactory and lasting results. That is particularly true with resection. We have had occasion to cystoscope many of these cases at various times subsequent to resection. In some we have found remaining nodules, or small lobes, that might well have been removed. In none of these cases, cancers excepted, have we found what appeared to be an extension of the original growth. In other words, there has been no recurrence. We believe the electric current prohibits the proliferation of these benign cells, thus making further growth of the gland unlikely. More time and observation are necessary to prove this point. We have obtained a satisfactory functional result in most of these cases, and none has been prostatectomized for urinary dysfunction. *Table 6* shows the total number of cases resected, the total number of resections performed, the number cured by 1 resection, and the number requiring 2 or more resections. Many of the cases requiring more than 1 resection were among our earlier cases. Some were small, sclerotic glands, many were large, adenomatous glands; and a few were advanced carcinomas. Most of the cases requiring 3 resections were carcinomas. In our last hundred cases only 6 cases required a second resection.

MORTALITY

Any report on a series of operations, such as this, is incomplete without some mention of the mortality incident to operation; and yet we know of no operation where the published records are so contradictory as in prostatic surgery. We will not bore you with these figures with which you are all familiar. Irrespective of what any enthusiastic writer may say, mortality in men with prostatic obstruction is relatively high. Every surgeon has the same problems to deal with, to wit: patients of advanced age, often with one or more complications. We think our series is quite typical. Of these 325 cases 267 were

Table 6

NUMBER OF RESECTIONS PERFORMED

Total number of patients	325
Total resections	389
Patients cured with one resection	268
Patients cured with two resections	50
Patients cured with three resections	7

in the seventh decade of life, or older. We have enumerated some of the more serious constitutional diseases associated with these cases. It is not reasonable to suppose that all of these men can have their symptoms of prostatism relieved without an appreciable number of fatalities. Many of these men are in a desperately acute condition when they seek relief; and it is impossible to save every case even by our most careful and intelligent treatment. In checking over the fatalities in this series we find that a few unexpectedly succumbed to a combination of hemorrhage, shock, or other complications. This number was offset by the survival of some whom we had little hope of saving. Hence, the actual death rate is perhaps as low as we can reasonably hope for, although not as low as desired.

Of more importance, however, is a comparison of one's mortality following resection with that following prostatectomy. Also one must take into account the types of cases treated by each method, the physical condition of the patients treated, and the relief afforded by such treatment. In these respects the odds are definitely in favor of resection. Our mortality in cases treated by resection is 50 per cent less than our mortality in cases treated by prostatectomy over the same period.

CONCLUSIONS

(1) Prostatic resection is an exacting procedure, requiring the intelligent application of a carefully worked-out technic based on a thorough anatomical knowledge of the vesical neck.

(2) The selection of cases suitable for resection is determined more by the surgeon's skill than by any other single factor.

(3) Complications incident to resection and unfavorable after-results are in direct proportion to one's ability to perform resection properly; and in no way reflect upon the operation itself.

(4) In our hands the mortality in prostatic obstruction has been cut in half, hospitalization time and costs have been markedly decreased, many disagreeable features of prostatectomy have been done away with; and many patients have been relieved by resection who would never have undergone open operation.

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DISCUSSION (*Abstract*)

Symposium on Prostatic Hypertrophy, Papers of Dr. Duncan, Dr. Wright and Dr. Dorman. (Paper of Dr. Duncan appeared in March issue, pages 277-279.)

Dr. Louis M. Orr, Orlando, Fla.—No accepted method of prostatectomy has become obsolete, up to this time, and it is to be doubted that it ever will.

Although we have, on several occasions, had the opportunity of hearing the results of many very much larger series of patients treated for obstructing prostatism by transurethral resection, I know of no series which has been more impressive than the one presented by Dr. Dorman. From these excellent results with associated low mortality rates and corresponding low morbidity, it is seen how advantageous transurethral resection can become in capable hands.

At the present time the operation of suprapubic removal of the prostate as well as removal of the gland through the perineum has been brought to a high degree of perfection. The time may not be far distant when so-called transurethral prostatectomy will likewise reach this degree of perfection.

These various procedures do not lend themselves to a discussion of their relative merits, the one pitted against the other, as one may be of great value in the hands of one surgeon with special training in its performance, whereas in the hands of another it may yield highly unsatisfactory results. Even though acknowledgment is made of qualifications of the surgeon brought about by experience, there are certain reasonable limitations that must be placed upon the claims for any one operation. Somewhere within these limitations will be found the optimum which will yield the most satisfactory results.

It can be stated with conservatism that neither of these operations has any general advantage over all others when applied to all cases. In certain selected cases, however, and these constitute a relatively small group, there exist indications which would point toward one or the other operation as the procedure of choice.

It can hardly be denied that the development of transurethral prostatic resection is one of the major urological advances of the past few decades. If nothing else can be said for this operation, it has made the laity aware of prostatic disease. Individuals afflicted with prostatism are being seen earlier than ever before. The proportion of patients seen after acute retention has taken place is less. As a consequence, there are perhaps many patients being operated upon who might recover by the use of less drastic measures. On the other hand, it is true that, because of its low mortality and minimal amount of shock, many patients who would in the past have been considered inoperable because of serious systemic diseases, have been able to obtain surgical relief from their prostatic difficulties.

The morbidity associated with transurethral resection has placed the procedure in disrepute with many, but the morbidity is not due in every instance to the opera-

tion; it is more often caused by the operator. The persisting infection often noticed is due in almost every instance to an incomplete removal of tissue, and until this tissue is removed there will remain an infected urine.

Not only do hemorrhages, strictures and incontinence of varying degree follow prostatic resection, but unfortunately these complications not uncommonly occur following perineal and suprapubic operations on the prostate, despite the precautions taken.

The type of prostate which one surgeon would select for perineal prostatectomy might be just as satisfactorily removed by another using the transurethral method. Large prostates are being removed today by transurethral resection with excellent results. There is no limit to what the resecting loop will remove, be it for good or evil, depending upon where it is placed. It is the personal equation in terms of ability among various surgeons which prohibits any dogmatic restrictions or limitations upon any form of prostate removal.

The great responsibility with which every urologist is faced today is that of being able to offer his patient a proficiency in every form of prostatic surgery. It is true, as Dr. Wright has said, that only a handful of urologists can perform expert perineal surgery. It is also just as true that not many more surgeons can perform expert transurethral surgery. Each group most certainly should strive to become skilled in both methods of surgery. Many training centers have consistently advocated only one, or perhaps two, methods of prostatectomy with the consequence that too many urologic surgeons today cannot offer their patients the procedure to which they are justly entitled. I should like to make a plea at this time and that is that every urologist become skilled in performing both simple and radical perineal prostatectomy. When consideration is given to the fact that one in every five to seven patients with prostatic hypertrophy shows signs of malignancy, either early or late, and that it is true that over 75 per cent of all malignancies arise in the posterior lobe, which can be removed only through the perineum, radical perineal prostatectomy offers the only hope of cure yet known.

Dr. J. Hoy Sanford, St. Louis, Mo.—Resection is a very refined and highly technical operative procedure and will never be successful in the hands of every operator. This is not unusual, as the perineal route and even the suprapubic approach offers difficult problems to some surgeons. Resection is probably the most abused operation in urology and in most instances the operation comes in for condemnation when in reality the operator is at fault. When such men of unquestioned ability as Thompson, Kretschmer, Alcock, Nesbitt and others give precedence to resection, it must have real value. In a previous paper I advocated resection in the minor and moderate obstructions, but I have since concluded resection is applicable to all obstructions if the individual operator has mastered the technic. I personally believe arguments for and against resection will continue and are too numerous to mention. After all, it finally resolves itself into this sane conclusion: "Do the operation that you feel will offer the best results under your individual guidance, whether it be resection or surgical enucleation." To be persuaded into an operation that offers you unsurmountable difficulties is not to your credit and certainly offers very little consideration to your patient. So much can be said for resection. It has decided advantages in these old debilitated individuals and with hemorrhage and infection better understood, its future offers much promise in the way of further progress for the good of the patient.

When you scan the country, it is interesting to note that resection is either employed totally in a particular section with surgical enucleation a rarity, or another section may be perineal or suprapubic with resection reserved for the lesser obstructions. I quite agree with Dr. Wright that to fit the patient to the operation is probably wiser than fitting the operation to the patient.

I venture to say that some of our most expert perineal prostatectomists would look anything but expert at suprapubic enucleation. This rule holds good any way you take it, at least for the majority. I do not mean to infer that there are no surgeons who can use all methods, but I do feel that they are in a minority. Dr. Wright called attention to the morbidity in resection as being greater than in surgical enucleation. I used to think that, but I am fairly well convinced that this is apparent in resections because of insufficient removal of tissue. Recurrence of obstruction is more likely, following resection than in total surgical removal, but the resections that are done expertly will show fewer recurrences all the time. Resect again is the answer to recurrence and we must not forget that an occasional recurrence occurs under enucleation and more than occasionally when an incomplete enucleation is done. The best lesson we have learned is to be thorough and to do the operation we can do best.

Dr. John E. Dees, Durham, N. C.—In spite of the well-known frequency of prostatic carcinomata (14 to 18 per cent of men over 50) there are lamentably few publications to be found in the literature concerning radical perineal prostatectomy, the only form of treatment which offers even a hope of cure. This operation has been sadly neglected and wrongly criticized, and I welcome this opportunity to bring it to your attention.

I have collected from the recent literature the reported results of treatment of prostatic carcinoma by various palliative methods as well as those obtained by radical perineal prostatectomy.

It is true that the patients upon whom radical perineal prostatectomy was carried out had clinically smaller and less advanced carcinomata than did most of the other patients. However, in the group treated conservatively, carcinoma in many of the patients surviving more than two years was diagnosed only from microscopic study of the surgical specimen and accordingly represents a much earlier lesion than those in the group subjected to radical removal.

Objections that have been raised to radical perineal prostatectomy are threefold: first, technical difficulty; second, urinary incontinence; third, the rarity with which we see prostatic carcinoma early enough to consider radical cure. Actually, the operation is not an especially difficult one for any urologist familiar with perineal surgery. When contrasted with the operation of combined resection of the rectum for carcinoma, it seems a relatively simple procedure.

The second objection, urinary incontinence, has largely been eliminated by recent refinements of Young's original technic, especially in anastomosing the bladder defect

to the membranous urethra. Seven of my eight cases have perfect urinary control.

If there is nothing to offer a patient with early prostatic carcinoma except palliation, there is no incentive to its early recognition. If we abandon our fatalistic attitude toward carcinoma of the prostate and actually search for early cases suitable for radical removal we will find them. If we urge routine rectal examination in all men over 50 and view with suspicion and, if necessary, biopsy any unduly indurated areas in the gland, if we have the tissue removed at transurethral resection and suprapubic enucleation studied carefully under the microscope for carcinoma, the rarity of early prostatic cancer will decrease.

Dr. Duncan (closing).—I want to say a few words about the use of the male hormone. We have been using it both before and after operation. We feel that our mortality has been lowered and also that our patients have made a much more satisfactory postoperative recovery. We feel sure that if you will use testosterone, both before and after prostatic operations, that you will be very much pleased with your results.

As to resections, I agree with the physicians who think the type of operation indicated for the relief of prostatic obstruction depends a great deal upon the operator as well as upon the patient. Some highly skilled surgeons feel that practically all prostates should be resected, while others prefer to remove the very large glands.

A few days ago Dr. Kretschmer, of Chicago, made the statement that he had not done a single prostatectomy for prostatic obstruction for the past five years, and that he felt reasonably sure that in the future he would remove only a very few, if any, prostates.

Resection for the relief of patients with malignant prostates, in our experience, has been by far the best way to treat them. We have seen very few cases of carcinoma of the prostate sufficiently early to cure by a prostatectomy, whereas not infrequently the patient may be carried along very satisfactorily for a number of years with one or more resections. A patient, whom I resected the first time in 1933, the second time in 1936, died in the spring of 1940 of a heart attack, at which time he was 74 years old. For the past four years his prostate, although malignant, had given him very little concern.

Dr. Wright (closing).—Dr. Orr has correctly said what I tried to express, that if for no other reason than the occasional opportunity to cure a malignancy one should familiarize himself with the technic of perineal prostatectomy. To date, I have done thirteen radicals for malignancy. Six patients are dead of carcinoma recurrence; two are alive over five years, one being a physician; two I have lost track of. That totals ten. Three have been done within the past two years at the Vanderbilt Hospital, and of these, one is alive seventeen months without a recurrence and has one hundred per cent urinary control. One is alive eight months without a recurrence, that is, demonstrable recurrence, and has one hundred per cent control, and the third case was operated upon four months ago and has not been checked for the past two months. At that time he had fair control, was very much alive, and, so far as we knew, had not developed a recurrence.

Dr. Dorman (closing).—I believe we will all go away from here with the idea with which we came, namely, to give our patients the best possible chance. In so doing we will do the operation that we can do best.

THE ROLE OF THE MILLER-ABBOTT TUBE IN THE TREATMENT OF INTESTINAL OBSTRUCTION*

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and
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I am going to talk about the role of the Miller-Abbott tube in the treatment of intestinal obstruction and describe several cases in which I have had personal experience with it.

You have all heard of this tube, but those of you who have not had occasion to use it may not recall its peculiarities and its differences from the ordinary stomach or duodenal tube.

Its peculiarities are two: first it has a partition running throughout its length dividing its lumen into two compartments; and second, it has a little rubber balloon on its end which can be inflated through one of the lumens after it has passed into the duodenum. This balloon is easily grasped by the peristaltic waves and carried on down the gut, pulling the tube after it. The open lumen can then be used as an ordinary duodenal tube either to inject fluid into the bowel or to aspirate the intestinal contents at any desired level.

The tube was devised in 1934 by T. G. Miller and W. O. Abbott,[1] of Philadelphia, for the study of intestinal physiology and chemistry, after they had tried all the old methods of intubation somewhat unsuccessfully.

Intestinal intubation was first successfully accomplished by Scheltema[2] in 1908, who used a tube 3-8 mm. in diameter for the introduction of medicinal substances into the gut. In 1919 Einhorn,[3] of New York, used an 8 mm. tube for the same purpose, but found it too small for aspiration. Buckstein,[4] in 1920, used a tube for the injection of barium in radiographic studies. Finally, in 1921, Einhorn,[5] still using a small (8 French) tube, successfully aspirated intestinal contents for study. McClendon,[6] in 1925, published x-ray pictures showing that a

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plain tube could be got into the lower ileum, and in 1926 van der Reis and Schembra[7] passed a tube all the way through and out the anus. The trouble, however, was that it took anywhere from 2 to 6 days and repeated feedings to push these tubes down to such levels. We can easily see why nobody thought of using them for the treatment of obstruction.

The idea of using an inflated balloon in the intestine is not new. Hotz,[8] in 1909, showed experimentally that the distended gut of peritonitis will contract when stimulated by a balloon placed within its lumen, and Jones,[9] in 1930, used an inflated balloon on the end of a tube to study the localization of gastro-intestinal pain. It remained, however, for Miller and Abbott to combine these ideas and perfect a tube which could be put into the ileum of 85 per cent of patients in 3-6 hours, and which would permit the aspiration of intestinal contents. They used the tube only for study of intestinal motility and secretion, not as a therapeutic measure. The idea of using constant suction on an inlying tube as a therapeutic measure we owe to Wangensteen,[10] who in 1931 reported 3 cases of acute obstruction relieved by this means. His trouble at that time was inability to get the ordinary duodenal tube which he used down near enough to the site of obstruction to permit thorough and efficient decompression. He advocated merely duodenal and gastric evacuation. He[11] points out the shortcomings of duodenal suction:

> (1) Drainage of the gut is done at a point remote from the site of obstruction, necessitating the removal of a much greater quantity of gas and fluid, to permit of the intestine's automatically adjusting itself and re-establishing its continuity, than if the gut had been drained by enterostomy near the point of obstruction. (2) In the interval during which one waits for the obstructing mechanism to relent the gut above the obstruction cannot be employed as a nutritive tube, as it can when the gut is drained near the point of obstruction.

It is apparent that the Miller-Abbott tube overcomes both these difficulties and has now become an almost indispensable instrument in the treatment of obstruction.

The indications for its use can best be explained after a rapid review of the therapeutic problem in intestinal obstruction.[11]

Let us consider briefly the sequence of events in acute mechanical obstruction. We are not interested at this point in the pathogenesis of the obstruction itself. What we want to know is what happens after obstruction occurs and how does it kill the patient?

At first the segment of intestine proximal to the obstruction contracts more and more forcibly, vainly attempting to send its contents forward and the patient experiences a sharp colicky abdominal pain with each contraction. He has intestinal colic. The normal movement of the intestinal contents is impeded all along the canal and stasis occurs. Then reverse peristalsis begins and the patient begins to vomit. First he vomits gastric residue, then duodenal bile, then the stercoraceous material of the lower reaches of the small intestine.

Normally about 2 gallons of salivary, gastric, biliary, pancreatic and enteric secretions are poured into the small intestine every day, and pass on down into the ileum and colon, where they are reabsorbed. But, in obstruction this passage is impassable. The patient vomits part of this fluid; the rest distends his gut, and with his retching and vomiting he swallows air, which becomes an increasingly important factor in the distension of the intestine.

The vomited fluid is rich in electrolytes, the gastric juice being strongly acid, the duodenal and pancreatic alkaline. At first this fluid loss is compensated for by the extracellular fluid reserves, but these are not limitless, and soon dehydration begins to manifest itself in a reduced blood volume. The pulse becomes rapid and weak, the renal circulation is inadequate and anuria and uremia appear. The excessive loss of chlorides in the gastric juice causes alkalosis, with increase in the carbon dioxide combining power of the blood.

As time goes on the intestine becomes more and more distended. Secretion continues at first and may even be increased, while absorption is decreased to about 10 per cent of normal. More and more gas collects in the gut, and with the passage of time it becomes a more important factor in distension than the liquid. This gas Wangensteen[11] has shown to be largely the nitrogen residue of swallowed air, and not, as was formerly thought, the product of bacterial putrefaction.

It is now that the x-ray will show distended loops of small bowel and the stethoscope reveals the characteristic high pitched tinkling peristalsis of obstruction. As distension increases, the circular muscle fibers of the bowel become stretched beyond their physiologic limits. They lose their tone and become flaccid and paralyzed. Peristalsis ceases and the abdomen is

silent. But the tension on the intestinal wall remains. It is the result of this tension that we are interested in now. What is its effect on the thinned out bowel wall?

Wangensteen[11] and others have demonstrated that the circulation is definitely impeded, the small vessels become engorged, but ordinarily necrosis does not occur for some time. The intestine retains its viability for hours, and as long as it remains viable and the patient's fluid losses are restored, he remains in good condition. He does not appear to suffer from a hypothetical toxin absorbed from the obstructed gut, but sooner or later, somwhere in the bowel wall, the circulation will become inadequate. Then viability is lost. It is then, and not until then, that the normal impermeability of the membrane to bacteria and their products is also lost. In the obstructed bowel the bacterial flora multiply prodigiously, and as soon as the bowel loses its viability these bacteria begin to find their way into the peritoneal cavity.

Wangensteen has shown that there is no evidence that a toxic substance is absorbed from the obstructed bowel until its viability is lost; and if distension is relieved before this occurs, the patient is none the worse off for it. But if it is not relieved, spots of gangrene will inevitably appear. This is the picture in simple mechanical obstruction.

Paralytic obstruction or ileus is in no wise different in its effects from the paralytic stage of mechanical obstruction. The intestinal stasis results in large fluid and electrolyte losses by vomiting, leading to dehydration and alkalosis, and in massive distension with eventual circulatory embarrassment. Thus the important fundamental factors in simple obstruction are fluid and electrolyte loss and distension.

In strangulation obstruction, on the other hand, we have in addition to the above two factors the more important one of sudden circulatory stoppage and subsequent gangrene, which can appear as soon as 4 hours after the onset of obstruction, and which may result in fatal hemorrhage into the strangulated bowel.

Now that we have outlined the therapeutic problem in obstruction, how are we going to meet it? It has been shown that the fluid and electrolyte losses can be adequately restored by intravenous saline, 3-4 liters per day, but there remains the distension and its ultimately fatal effects. How are we to relieve distension? The old surgeons realized the importance of decompression and attacked the distended bowel directly. They did an enterostomy. Monks,[12] in 1905, even suggested threading the opened bowel onto a glass tube, but the trouble with enterostomy is the danger of peritoneal contamination, which, with the high bacterial content of the obstructed bowel and the usually poor condition of the patient nearly always results in a fatal peritonitis. Here is where our tube comes in, in effect a nonsurgical enterostomy. Peristalsis, even in the paralyzed and distended bowel, is stimulated sufficiently to carry the balloon down at the rate of about a foot an hour, with constant suction removing the fluid and gas from the distended bowel in front of it. In this way, Abbott and Johnston[13] have shown, it goes right down to the obstruction, thereby serving as a reliable localizing guide. Frequently, in mechanical obstruction caused by kinks due to adhesions and perpetuated by distension, decompression alone will serve to relieve the obstruction and the patient will require no surgery. The symptomatic relief after decompression is immediate and amazing. Of course if operative removal is required, the operation is made safer and technically easier by the previous decompression. If resection is required, suturing is made easier by the thickening of the gut wall which occurs with the relief of distension, and tension is taken off the suture line. Postoperative distension is prevented by simply leaving the tube in place. In this way the patient can be given water and nutritive fluids by mouth, to be absorbed from the decompressed gut above the obstruction. Nausea and vomiting are prevented and the well-known "gas pains" avoided. It is in the prevention of the baneful effects of postoperative ileus that the tube finds one of its most valuable uses.

Thus we see that the prime indication for the Miller-Abbott tube is distension, or the likelihood of distension: distension from obstruction, mechanical or paralytic, preoperative or postoperative, traumatic or toxic, in appendicitis or in pneumonia.

As for contraindications, actually there are none. In no case does the Miller-Abbott tube do harm. However, the danger is that we will fail to appreciate its limitations and rely upon the tube to do something it cannot do. It cannot relieve strangulation obstruction, and in the presence of strangulation there is no excuse for temporizing. Immediate operation with transfusion to replace blood loss by hemorrhage is the only treatment. Thus the most important thing in the management of intestinal obstruction is the recognition and immediate operation of

strangulation. Nor is the tube of much value in colonic obstruction, where as a rule there is little or no distension of the small bowel. It is especially dangerous to rely upon it in obstruction of the left colon with tremendous distension of the cecum, which is liable to rupture. Cecostomy is the proper treatment here.

Actually we pass the Miller-Abbott tube immediately in all cases of obstruction and leave it in place whether operation is undertaken or not. In many obstructions due to adhesions, the decompression alone is sufficient to restore the continuity of the gut as pointed out above. However, we have found that it is advisable in all cases of acute obstruction seen within 24 hours of onset to operate immediately, whether the obstruction is thought to be due to bands or not, because these early cases have usually not had time to become dehydrated to a dangerous degree, and the mortality is practically zero. In cases seen after 24 hours, conservative treatment may be advisable, especially in the older age group, at least until decompression and complete hydration are accomplished. In the late case of obstruction seen 48 hours after onset, we must not be in a hurry to operate, since this patient is a very poor surgical risk. In the absence of strangulation and except for the danger of ultimate starvation, the obstructed patient can be maintained indefinitely by restoring his fluid losses with saline and relieving or preventing distension by the Miller-Abbott tube. All the time, however, we must be on the alert for the rising blood count or the appearance of rebound and point tenderness signalizing the presence of strangulation.

Postoperative ileus due to handling the intestine or to a plastic exudate, and toxic ileus of peritonitis or other infections, such as pneumonia, are especially amenable to decompression by the tube. We have not had to do an enterostomy on such a case since we began to use the tube 3 or 4 years ago.

As for the practical details of passing the tube, we have found that in most patients it goes through the nose and into the stomach quite easily. Having it iced and lubricating it with surgical lubricant or glycerine, which do not damage the balloon, facilitates the passage. Passing it through the pylorus can usually be done by having the patient lie on his right side for half an hour or so, being careful not to feed the tube in so fast that it coils or kinks in the stomach. Giving iced liquids also seems to help. It can sometimes be inflated and floated to the pylorus by having the patient lie on his left side. If these maneuvers fail, passing it by fluoroscopy is usually successful. Of course, you will occasionally find a patient in whom passage through the pylorus is impossible, and in these we must be satisfied with gastric suction.

We have found that a negative pressure equal to that of a column of water 2-3 feet high is about right. We leave this on constantly until decompression is complete. We measure the aspiration and urine volume to be sure the fluid intake is adequate to prevent dehydration. We have left the tube in place as long as two weeks without difficulty. Occasionally, it will become plugged with mucus, but this can usually be removed by injection of soda bicarbonate solution with a syringe. When we think the patient can get along without it, we clamp it off for a few hours at a time as a test before removing it altogether.

The only real complication of this method of treatment which I have heard of is the very rare occurrence of pressure necrosis of the cricoid cartilage resulting in hoarseness and only three cases of this have been reported (*Northeast Journal of Medicine*). Of course, it should be kept in mind and the tube removed if it should occur. I have also heard of a case of a nurse who by mistake inflated the patient and aspirated the balloon! However, with proper marking of the terminal limbs, such errors should easily be avoided.

I shall now briefly describe three cases in which I have used the Miller-Abbott tube.

Case 1.—In August, 1938, a boy, aged 10, was seen with a gangrenous, ruptured appendix. He had been ill for three days. He was operated upon and his appendix removed through a right rectus incision. A cigarette and tube drain were extended into the *cul-de-sac*. His postoperative course was satisfactory for five days; then pain, distention and vomiting were indicative of obstruction, probably due to agglutination of the small intestines in the pelvis. He had been getting 2,000 c. c. of glucose daily, and apparently was taking care of the peritoneal infection. He was given a soft diet on the fourth postoperative day. It had been our custom when we encountered this postoperative picture to do an enterostomy under local anesthesia. However, we had recently obtained a Miller-Abbott tube and felt that this was an ideal case for trial. The tube was introduced through the nose and fed into the stomach according to directions. In 24 hours the boy's abdomen was flat, the general condition was improved, and in 48 hours he was expelling flatus and having liquid stools. He made an uneventful recovery. If we had not had the tube we would have done an enterostomy upon this boy, probably with less success. At least it would have prolonged his stay in the hospital.

Case 2.—A young lady, aged 14, had been placed in

a plaster cast to correct a lordosis of the spine. She had on other occasions been placed in a cast and suffered very little discomfort, but on this occasion pain, vomiting and distention necessitated its removal. She continued to vomit and though intravenous glucose was given her daily, she became very weak, with a pulse 140-160, subnormal temperature, and she was delirious. We were asked to see her in consultation and advised the Miller-Abbott tube and continuous 5 per cent glucose in saline up to 4,000 c. c. in 24 hours. In 24 hours the abdomen was flat, pulse 100, and temperature 98°. The patient was mentally clear and made a rapid recovery.

Case 3.—Mrs. C., aged 70, had had a hysterectomy twenty-one years earlier for fibroid. She had a history of pain in the abdomen, nausea and vomiting, distention and enemas with no relief. Her blood count was 8,400, polymorphonuclears were 70, red cells 3,800,000 and urine negative. Her blood pressure was 100/75, respirations were 22, temperature 97.6°. She was exhausted and dehydrated and her pulse was 120. Glucose and saline were given by hypodermoclysis and intravenously. Nausea was not relieved. She was a poor operative risk. The Miller-Abbott tube was inserted, the abdomen decompressed, flatus expelled and a liquid stool was produced in 48 hours. The patient recovered and in six months has had no recurrence of symptoms.

We have used the Miller-Abbott tube in 26 cases with 3 failures. All three were cases with large gut obstruction, two of which had had colostomies done. The third refused operation, and autopsy showed carcinoma at the sigmorectal junction, which, however, was diagnosed three months prior to hospitalization.

SUMMARY

The Miller-Abbott double lumined tube has been described, with its historical antecedents. The therapeutic problem in intestinal obstruction has been outlined and the fundamental factors have been evaluated. The use of the Miller-Abbott tube, its indications, contraindications, limitations and complications have been discussed. Cases in which it was used successfully have been described.

CONCLUSIONS

(1) The fundamental factors in the therapeutic problem in simple small bowel obstruction are fluid and electrolyte loss and distention.

(2) The fluid and electrolyte loss can be adequately replaced by intravenous saline.

(3) Distention can be overcome or prevented, the mortality sufficiently lowered, and many cases of obstruction cured by the routine use of the Miller-Abbott tube with constant suction in all cases of intestinal obstruction.

(4) The Miller-Abbott tube should be passed immediately when the diagnosis of obstruction is made, whether operation is to be performed or not.

(5) The only danger is that failure to realize its limitations may permit strangulation of the bowel or rupture of the cecum to occur without operation.

(6) The only true complication, pressure necrosis of the cricoid cartilage, is exceedingly rare and is an indication for removal of the tube.

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THE REHABILITATION OF CEREBRAL PALSY*

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Cerebral palsy is one of the problems which lies in the general field of the care and treatment of the handicapped. In order to have a clear idea of its place, it is necessary to consider the classifications of the handicapped in general.

These can be said to comprise four fields and cerebral palsy is represented in three of them. The first is of motion, or the motor handicapped,

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including all forms of crippled individuals. Crippling may result from interference with the use of the muscles or nerves as in infantile paralysis; the joints as in arthritis; and from amputations or other structural variations.

The second field is made up of the sensory handicaps: those involving the various special organs such as sight, hearing and sensation. It would, of course, also include smell and taste, although the absence of these would be very minor compared, for example, to blindness.

The third field is that of the mentally handicapped. These may have perfect ability to take in and gain information and knowledge, as well as perfect ability to express this knowledge by motor response; but they are unable to utilize and analyze the knowledge gained because of handicaps involving the mind.

The fourth field is a large, diffuse group of functional and organic handicaps, including conditions such as heart disease, either acquired or congenital, kidney disease, tuberculosis, and the like.

The causes of all of these handicaps may be congenital or defective development; injury at or around the time of birth; or they may result from acquired postnatal injury or disease of many types.

In considering the importance of handicaps in general, it is necessary to know the frequency or distribution of the particular handicap throughout the population at large. This must be known in order to determine ways and means of procuring the necessary care. Excellent facilities for the care of individual handicaps exist for the blind, the deaf, infantile paralysis, arthritis, mental defectives, tuberculosis, and other well recognized and widespread conditions. In these instances, it has usually been found that the various types of handicaps may either be cured or ameliorated or substituted for; but it is seldom that any has been considered completely hopeless. An exception to this would be the severely mentally handicapped. An example of substitution is that of the blind, where it is certainly true that large numbers of them can in no sense of the word be cured, and yet by means of special training and education they are able to substitute for the lack of sight and live fairly normal lives.

The specific type of handicap under consideration is cerebral palsy, which has been studied in the past probably the least of any of the major handicaps in point of frequency. Attention was first drawn to it in the group of motor handicaps, and it became especially the interest of the orthopedic surgeons. However, they felt much dissatisfaction with the problem and with the results which were being obtained. A large part of this dissatisfaction was due to the fact that the handicap of cerebral palsy is not strictly motor alone, but involves other fields of the handicapped which are easily overlooked in this condition. In the treatment of these by the orthopedic surgeons the other manifestations of cerebral palsy could not well be taken into consideration, since they lie entirely outside the field of orthopedic surgery.

It is becoming more and more apparent that cerebral palsy represents one of the major handicaps in point of frequency. It is necessary also to know its severity, or its importance with regard to the usefulness of the individual in society.

Second, the exact nature of the handicap must be studied to determine whether it represents a single unit type or whether it is a group of handicaps under a single name (like arthritis).

Third, the methods of cure, amelioration or substitution must be investigated.

In determining the frequency of cerebral palsy it can be stated that considering the difference in etiology, the number is as great if not greater than the number of cases of infantile paralysis throughout the country. Infantile paralysis is, of course, spotty in its distribution, and it has been found that cerebral palsy is rather evenly and generally distributed. The results of recent surveys both in urban and rural areas and in various parts of the country have shown that the number of cases of cerebral palsy represents about seven born per year per 100,000 population (approximately seven per fifteen hundred births). This would indicate that the majority of cases of cerebral palsy are either congenital in origin or acquired at birth. However, in these surveys there have been found a number of cases which are the result of encephalitis. There are other causes of postnatal cerebral palsy also, such as cerebral hemorrhage resulting from whooping cough, for example, or from head injuries, but the majority are either congenital or birth injured.

Further statistics on large groups studied have shown that the per cent of true mental deficiency associated with cerebral palsy is much lower than had generally been considered previously. At present, surveys show it to represent about 30 per cent of the total. This indicates that 70 per cent of these cases form a group which if

treatable physically would be worth rehabilitation.

The statistics have also shown that the death rate in these cases is not very high, and that the large majority live to at least middle age, if not well past it. There is a death rate during early childhood of about one out of every seven cases.

Therefore, out of the seven born per year per 100,000 population, at least four would be considered treatable from the standpoint of mentality.

This rate of four treatable cases per year per 100,000 population has been found to be fairly constant throughout both rural and urban areas and in the various parts of the country in which the condition has been surveyed. The determination of the number of cases in any locality can, therefore, be worked out utilizing these figures.

The severity of the condition, in its relationship to society at large, is next considered. This is found to be variable in cerebral palsy. There are cases of the utmost severity in which there are absolutely no use of the arms and legs, absence of speech, poor mentality and sometimes hearing and sight defects. The opposite of this extremely hopeless condition is one in which the handicap is almost negligible. It may involve the use of one foot or one hand and be noticeable only by a slight limp or a greater than normal degree of one-handedness.

In attempts to determine the severity of handicaps the figures are as follows:

Mild	28	per cent
Moderate	44.3	per cent
Severe	27.7	per cent
	100	per cent

Or roughly, 50 per cent are of moderate degree, with 25 per cent severe and 25 per cent mild.

The next consideration is the exact nature of the condition. Cerebral palsy differs from other types of handicaps in that its nature is definitely multiple. It does not represent a single handicap such as poliomyelitis, involving only difficulty with the use of the muscles, or blindness in which the difficulty is only with the eyes, but is frequently a combination of both motor and sensory involvements.

As has been stated, cerebral palsy was formerly considered solely a motor handicap. On this basis a great deal of confusion arose, since the other associated handicaps were not recognized and the difficulties with the training and educating of the child were attributed wrongly to mental deficiency. True mental deficiency does exist in some of these cases, but the determination of true mental deficiency must be made only after accounting for all the other handicaps that can be found.

Even in its motor attributes cerebral palsy does not represent a single entity but, depending upon the part of the brain involved, it is manifested as one of three types of disturbance. The brain is such a complicated organ and possesses so many different functions that the portion injured, diseased or defective determines the type of disturbance.

A very broad but usable classification of the motor functions of the brain is: first, the basal nuclei which are concerned chiefly with coordination and the control of involuntary motion; second, the cortex where lies the control of voluntary motion; and third, the cerebellum which has chiefly to do with the function of balance. The sensory areas and the frontal lobes, if involved, would add further complications to the motor problem.

The three motor areas of the brain concerned with control of motion are rather widely separated from each other and lesions involving the various localities can be distinguished as rather typical. Thus, grossly, we can separate the types of cerebral palsy into those involving the base of the brain, those involving the pyramidal system, usually the cortex, and those involving the cerebellum.

The coordinating mechanisms of the basal ganglia normally control involuntary motion so that damage in this general area of the brain results in the presence of unwanted motions. The first group, therefore, is characterized by the presence of unwanted involuntary motion. This has been called for brevity, athetosis. Disturbance of the pyramidal system, usually the cortex, produces spasticity, while damage to the cerebellum produces incoordination or ataxia.

Athetosis, spasticity and ataxia may be associated with mental deficiency or not, and with defective sensation, sight or hearing in varying degrees. However, it is very difficult to explain how mental deficiency can be associated with pure athetosis or ataxia. Damage to the base of the brain or the cerebellum would be so far away from the frontal lobes that it would be unlikely that they would be affected. If the frontal lobes were also affected the damage would

be so widespread that the survival of the child would have been unlikely. On this basis of reasoning, it would be improbable that mental deficiency would be associated either with ataxia or athetosis, whereas by proximity it would be much more possible in spasticity. Careful analysis of many cases tends to bear out this reasoning.

In the study of these cases it is quite obvious that the associated handicaps have been overlooked because of the prominence of the motor phase. These handicaps are those of the sense organs in particular. They may involve variations in the amount of sight or eye control and are not necessarily defects of visual acuity such as refractive errors, but may be actual nerve damage or frequently the result of nystagmus and other unusual eye movements.

In the athetoid group there is a very definite incidence of defective hearing. This is of a central nature and does not represent total deafness. It is usually limited to certain pitch ranges so that the child does not hear the differential sounds in words clearly enough to distinguish one word from another. The result of this is, of course, defective speech, since the child speaks only what he hears, accompanied by apparent inability to understand thoroughly what is said to him. This can be analyzed if sentences are formed in such a way as not to contain words which can be confused by absence of upper pitch ranges. It is practically impossible in many of these children, especially at the age when the speech lack is first noticed, to determine hearing range difficulties by any audiometric test. However, if the sounds can be charted as regards their relative position in the pitch range, and then the sounds which are not utilized by the child listed, the approximate level of the hearing cut-off can be determined. Of course, these children are not deaf to most noises and many of them are perfectly able to hear a pin drop, but still are unable to understand much speech.

In the spastics, there are other types of hearing abnormalities which are of the nature of real aphasia, due apparently to actual damage to auditory speech areas. In still others there are speech defects not based on hearing, but suggestively due to indeterminate handedness. These are usually of the stammering variety. In some of these a very mild handicap of the dominant arm, usually the right, of course, will result in a shift of handedness which is incomplete, and the child may show a speech defect. These defects can frequently be cleared up by fixing the handedness more definitely. Still other speech defects are direct results of spasticity or involuntary motions in the tongue.

In some of the spastic hemiplegias it has been found that there is actual lack of fine sensation, or even gross sensation in some cases, in the affected arm. In these, the arm may be only slightly motor handicapped, so that it is surprising that it is not used more. If it is borne in mind that sensation may be absent or decreased in the arm, it is readily understood why the arm will be used very much less than is normal.

It is important, therefore, to determine all of the handicaps present in any cerebral palsy before making the mental evaluation, since obviously an unsuspected deafness, especially such as the type which has been described in the athetoid, would lead to a very inaccurate mental status. If it can be imagined that a child cannot hear words clearly enough to distinguish several which sound alike, and if this hild at the same time has incoordination in the arms so that he cannot draw a straight line, point to the particular pictures he wishes to, or place blocks correctly, it can be seen that an extremely inaccurate intelligence quotient would be obtained on a Stanford-Binet test. However, if all the handicaps, both motor and sensory, have been determined and are taken into careful consideration, then a fairly accurate evaluation can be made. Many of these children are regarded as bad behavior problems, but the trouble may be due to unsuspected defective hearing, difficulty with sight, or other combinations which work against proper function and behavior. If two handicaps, such as incoordination in the arms and poor vision, are combined, it can be seen that the resultant difficulty will be greater than the actual sum of the two handicaps.

If such a child were receiving treatment only for the motor phase, the visual phase being neglected, then eye to hand coordination and activities, such as writing and dressing, could be but poorly learned. But if the eye handicap was also taken into consideration and methods evolved for training the child in writing, buttoning buttons, and so forth, with allowance for both handicaps, the results would be greatly enhanced. The search for the "hidden handicap" should always be carried through even in the face of the most unlikely probabilities, especially when a child seems to present a picture of mental deficiency without adequate explanation.

Having determined all of the factors in the

situation, it is obvious that no single method of treatment can be set up. All methods of treatment of all types of handicaps must be combined in this field, and facilities must be offered not on a one-sided basis, but a well rounded plan arranged. It is true that cerebral palsy as we know it at present cannot be cured, but it can be ameliorated to a very great extent when proper methods are used and in many instances substitution must be utilized. Just as by careful early thorough treatment infantile paralysis can be greatly improved, and as by substitution methods alone the blind can be made to take a place in society which is at least of some value, so by the use of combined methods of all sorts the cerebral palsied child can be brought to a level which is reasonably adequate.

The greater part of the treatment of these children is nonsurgical, since surgery has been found effective only in the group of the true spastics. The distribution of the three general motor types in the field of cerebral palsy is, spasticity 40 per cent, athetosis 40 per cent, and ataxia 20 per cent. Surgery is therefore of little help in 60 per cent of the total except in the case of true contractures.

The importance of nonsurgical treatment cannot be overemphasized when it is borne in mind that these children have in most instances been handicapped from the time of birth. Many fundamentals of the use of the arms and legs or speech mechanics have not even been developed. Until the fundamentals, developed automatically by normal babies, have been learned, the finer coordinations dependent upon these fundamentals cannot be taught. A concrete example is the function of reciprocation in the legs. This is a fundamental which is learned by the normal baby in kicking the sheets and bed clothes long before he is on his feet. If this reciprocal kicking of the legs has not been developed because of spasticity in the legs, or some other difficulty with them, then the child cannot be expected to walk until this fundamental has been trained in. Many fundamentals of this type can be listed and these must be learned before anything more complicated can be undertaken in the motor field. Some are associated with speech, in connection with the use of the tongue, breathing, and other parts of the speech mechanism.

The methods used at present depend upon the type of the condition. They include relaxation, reciprocation, the reach and grasp, coordination, balance training, and surgery. Special educational methods must often be called upon which include those utilized in sight conservation and the hard of hearing.

The type of training is differentiated with regard to the type of cerebral palsy. Thus, in the spastic, reciprocation and reach and grasp as fundamentals must be first learned. Surgery then plays an important part in this particular subdivision. Following surgery, re-educational training by further development of reciprocation and the reach and grasp are used to bring about walking and improvement of self help in the arms. In the athetoid, the use of relaxation is of fundamental importance since athetosis disappears or is very greatly diminished by increasing degrees of true relaxation. Following this, motion from the relaxed position is taught. Peripheral surgery has no place in this particular group. In the ataxic, balance training is of primary importance. The ataxic being unable to utilize the automatic balance, mechanism must therefore be trained by the cortical substitution of voluntary balance which is brought eventually to the habit level.

However, these various technics are not limited strictly. The spastic or the athetoid both have had lack of experience in balance, and when the arms and legs have been sufficiently trained to allow for better balance experience, then practice is decidedly necessary to bring about the ability to walk.

Following these fundamental training technics, the rehabilitation of the child for some particular life work must be kept in mind in order to direct him towards his proper placement with the most economical use of his time.

It can be seen that a highly trained personnel is necessary in order to bring about satisfactory results in cerebral palsy. In connection with the various technics involving physical re-education, there must be a thorough basic knowledge of the field of physical education. The re-education of these children from extremely limited ability up to the normal parallels the physical education of normals for special types of highly skilled activities. Physiotherapists with special training in the field of infantile paralysis are essential so that muscle examinations and muscle isolation and re-education can be carried out accurately. Later, occupational therapy should play a very definite part in the development of the normal more skilled activities. The place of occupational therapy in cerebral palsy is in training total activities such as the use of the knife, fork, and spoon; buttoning buttons, typing, tying shoes, and other complicated motor activi-

ties which have been prepared for by the physiotherapist and orthopedic surgeons. In addition, the use of the methods for sensory development such as eye training, ear training, and special educational methods must run parallel to the motor retraining in order to bring about satisfactory results.

The aims of treatment may vary widely. The decision must be made from both the economic and the individual viewpoint. Rehabilitation for some life work should be the first consideration. It is frequently attained. However, if this does not prove possible, then treatment may achieve a second but also important end: that of freeing the handicapped individual from being cared for by a second individual who may thus fill a more valuable role. If a previously helpless individual can be brought to the point of fairly complete self-help so that he is no longer dependent upon another throughout the course of his daily life, the result is still economic rehabilitation for the family. If even this is not possible due to severity of handicap, treatment may bring about greatly increased happiness to the patient by choosing as an aim interests which can be so selected that he will be able to entertain himself successfully the greater part of the time.

The problem from the motor standpoint may be one of legs, for locomotion; arms for self-help; speech for communication; or that less clearly definable but no less important characteristic, general appearance, which has much to do with employability. The presence of grimaces, drooling, or even an awkward gait, must be recognized as a very important factor in complete rehabilitation.

From this point of view, severity of handicap is not the deciding factor for or against treatment. If the legs are so severely handicapped that they cannot be improved, still the arms may be trainable so that the patient is no longer bedridden and helpless, but able to feed himself, dress himself, get in and out of a wheel chair and wheel it. Or, if arms and legs are both not trainable and the patient has no speech, then his greatest need and primary consideration is for the attainment of speech should he suddenly be left alone or separated from his family. The opposite extreme would be the very mild condition, characterized only by facial grimaces, for example, which if eliminated would change the whole character of his life and increase employability immeasurably.

SUMMARY

(1) Cerebral palsy represents a major problem from both a public health and rehabilitation viewpoint, considering its frequency and distribution. This problem must be faced if treatment of all the handicapped is to be impartial.

(2) It is a multiple problem which involves not only a motor handicap, but is coupled with sensory phases, usually the special senses of sight and hearing, which must also be treated.

(3) Mental deficiency is sometimes present, but this must be determined only after careful evaluation of all other handicaps.

(4) Cerebral palsy is of three general motor types, namely: athetosis, spasticity, or ataxia, and the treatment of these three types varies widely.

(5) These conditions are not curable, but capable of great improvement with thorough and adequate treatment and substitution methods.

(6) Special training for the technicians in this field is necessary to carry out adequate treatment.

(7) Special educational methods are often necessary to achieve successful schooling.

(8) Severity of the condition is not necessarily a criterion as regards treatment.

(9) The aims to be attained in each case must be carefully worked out with regard to legs for locomotion; arms for self-help; speech; and general appearance.

(10) Rehabilitation of the individual should be considered first. Second, and almost as important, is freeing the individual from the care of another if complete or economic rehabilitation should not prove possible.

3038 St. Paul Street

DISCUSSION (*Abstract*)

Dr. J. Hiram Kite, Atlanta, Ga.—We are all seeing spastics and mentally deficient cases, and we wish there were a place to send them where everyone handling them would understand the condition, from the house mother on up to the director, as they do in Dr. Phelps' hospital.

I have seen Dr. Phelps' splendid work in Newington, Connecticut, and at Vineland, New Jersey, and if we had places like these in other sections of the country, what a help it would be to all of us.

I had the pleasure of being with Dr. Phelps and Dr. Baker at Duke several years ago when they established a unit there for the treatment of these mentally handicapped children. It is because of the experience that Dr. Baker has had at Duke that he has been asked to discuss Dr. Phelps' paper.

Dr. Lenox D. Baker, Durham, N. C.—I want to express my appreciation for the opportunity to outline the work which is being attempted in the Cerebral Palsy Clinic at Duke Hospital.

About five years ago a citizen of North Carolina made it possible through a small grant for the Orthopedic Division of Surgery to begin a study of cerebral palsy cases. Approximately two years were spent in examining patients and in gathering data from the members of the medical society and hospital records of North Carolina. The result of this survey has been included in Dr. Phelps' statistics. Three years ago, through the cooperation of Duke University, there was opened on the campus a twelve-bed dormitory under the direction of the Orthopedic Division of Surgery for the treatment of children showing a nervous system lesion, the history of which dated from birth and which manifested itself in some form of motor disability. Admission has been limited to those children who have, or show signs of having, normal mentality. The purpose of the clinic is to present a practical approach to the conservative treatment of these children. It is hoped that our medical graduates as well as the graduates of the other departments of the University will realize the possibilities for this type of child, and at the same time an effort is made to fit the child for the environment in which he will have to live. In the work Dr. Phelps has been most cooperative and generous with his time and the studies have been carried out under his supervision. The results, as far as the patients are concerned, bear out the findings presented here today, and there is no need for further comment. However, we do feel that there are other factors that need to be emphasized which are of importance to the orthopedist. Dr. Phelps, in his work, has shown us the importance of differentiating the different types of cerebral palsy. He has shown that feeblemindedness is not present in 70 per cent of the cases and that the response to treatment in no way parallels the severity of the case. We have noted that physical improvement can be judged in a large measure by the schoolroom work and the reverse is also true. The results of therapy in this type case has in the past been uniformly bad and there is a great need for more knowledge on the subject. More surveys need to be made and plans for treatment outlined and understood. Cerebral palsy offers a constant and predictable source for orthopedic patients. It is no respector of class or creed. With the constant improvement in chemotherapy and further knowledge of virus diseases the time may well come when many beds now filled by tuberculosis, osteomyelitis and poliomyelitis victims will be empty and perhaps thrown open to the long-neglected cerebral palsy sufferers. Without further studies we cannot hope to be prepared to understand the problem and carry out proper therapy when the opportunity comes. In closing, I should like to mention one other aspect of the problem, the patient's family. You have no idea what it has meant to the families of our patients to have a school in which they can place their child for physical and mental training. It has been a great pleasure on our part to be in contact with these patients and to give their families an opportunity to feel that they are doing something for the patient and at the same time are removing a handicap from the other members of the family.

Dr. Paul C. Colonna, Oklahoma City, Okla.—Orthopedic surgeons see a number of spastics or cerebral palsy cases, but until Dr. Phelps began to give us an alphabet regarding these cases and began to point out some of the fundamental methods of treatment, we as orthopedic surgeons were simply focusing our eyes upon the correction of the deformities.

It is not a new problem, but we have a new insight into the problem. Simply his division of the subject into three types upon which we can base our future treatment, outlining to us the limitations of treatment to which each case is particularly suited, is of tremendous value.

All of us cannot have individual homes in which to place these children. All of us are not able to have an organization, a plan, such as Dr. Phelps has and such as Dr. Baker has, but we have been given a new concept of the condition.

I think stressing the fact that these children should be treated in homes allocated for their care so that they can get a well-rounded course of treatment, the group training idea, is very essential in obtaining satisfactory results.

The fact that Dr. Phelps has brought out and has emphasized the conservative treatment, and in a secondary capacity the operative treatment, is of fundamental value. We are all beginning to realize that simply correcting the body deformity is putting the cart before the horse.

Dr. J. Albert Key, St. Louis, Mo.—I should like Dr. Phelps to express an opinion upon the effect of the operation for the removal of a portion of the motor cortex in athetosis.

Surgeons are taking out part of the motor cortex in athetoid cases, and I should like to know whether Dr. Phelps thinks that this is a useful operation.

Dr. Phelps (closing).—It is true that financial difficulties are great in this problem. In various states in which units are set up the chief aim is the attainment of hospitalization long enough to bring about satisfactory results. This cannot be accomplished in a matter of a few months. Measurements of improvement as suggested by Dr. Key are difficult. Moving pictures are not always a true indication of improvement. The use of graphs, for example, show first how long a child can balance in seconds, and then minutes, followed by graphic representation of the number of steps with which he can cover a certain distance. This would indicate improvement in the use of the legs very accurately.

In the arms a similar measurement can be made of the length of time taken to lace the shoes, dress, or write a line.

The various surgical operations, such as Putnam's operation on the lateral pyramidal tracts in the cord and the removal of parts of the motor cortex, are showing results, but it is a little early to determine the final effects. Certainly these operative procedures are of great use in very severe cases.

FRACTURES OF THE HUMERUS TREATED BY THE HANGING CAST*

By R. Arnold Griswold, M.D.
D. C. Hucherson, M.D.
and
E. C. Strode, M.D.
Louisville, Kentucky

The multiplicity of methods shown in the surgical literature for the treatment of fractures of the humerus is testimony that the usual procedures are not satisfactory, whether they be traction in bed, open operation, or cumbersome abduction casts or splints. Since 1933, we have used in over 300 cases a method which has proven eminently satisfactory in our hands. This method has been used almost routinely in all patients who could be ambulatory. Exceptions have been: (1) extension supracondylar fractures in children; (2) extensive compound fractures which were treated at first by skeletal traction, and then by this method after the danger of severe infection had passed.

The method is not new, and its principles are shown in many of the older textbooks, illustrated by a patient with his wrist suspended by a sling, coaptation splints on his arm and a bag of shot or sand suspended from his elbow. This appliance has been modified to use a plaster cast by Caldwell,[1] Rush[2] and ourselves,[3] as well as others. We first saw the method used in Caldwell's clinic at the Cincinnati General Hospital. It depends upon traction exerted in the line of the humerus by the weight of the cast and of the extremity below the fracture. This traction is exerted with the humerus parallel to the body and vertical, while the forearm is held in a horizontal position by a sling at the wrist.

Procedure.—After reduction of the fracture by manipulation (the weight of the cast will reduce most fractures of the shaft) a padded or nonpadded cast is applied from the knuckles to the axillary fold, with the elbow at right angles. A loop of wire or plaster is fixed to the cast at the wrist, so that the sling may be attached here. This insures against slipping of the sling toward the elbow, which would destroy the traction effect of the cast.

The cast is allowed to hang free on this sling and should not be bound to the body. The patient is instructed to be up and about, not to support the elbow and to sleep in Fowler's position for the first week, with a pillow behind the arm for support. Circumduction exercises are encouraged from the start, cautiously at first, but after a week swinging the arm freely from the shoulder. This is continued throughout the course of treatment. If these exercises are carried out faithfully, artificial physiotherapy is seldom necessary, as limitation of shoulder motion and muscle atrophy are absent or minimal.

Fractures at the extremities of the bone require special mention. While most fractures of the shaft will be reduced by the weight of the cast, those above the insertion of the pectoralis major (fractures of the head and of the surgical and anatomical necks) must be reduced. The cast is applied after reduction. We have used the maneuvers of Cotton and Morrison[4] and of Howard and Eloesser[5] with satisfaction. When these fractures are properly reduced, the traction cast will maintain reduction. A rare exception to this statement occurs when the tendon of the long head of the biceps is ruptured. In this case, operative reduction is indicated.

Fractures of the lower third of the shaft (supracondylar) also must have special treatment. In these fractures we usually have a varus deformity. This is due to loss of a suppinating action of the biceps, so that the elbow joint is held in pronation.

Putting such an arm up in spination or midposition throws the distal fragment out of place laterally. For this reason, these cases should always be put up in full pronation.

T and Y fractures of the lower end of the humerus may be treated by this method if good reduction is obtained before applying the cast and the latter is carefully molded over the condyles. The traction exerted by the cast will then maintain position.

RESULTS

The above procedure has been used by us in 305 cases of fracture of the humerus at the Louisville City Hospital. These patients ranged in age from 2 to 101 years, with an average age of 43.5. They were in the traction cast for from 20 to 148 days, with an average of 48.8 days. In addition, numerous private cases have been

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treated by the senior author and his colleagues in Louisville. These are not inclued in this report.

The following tables indicate the types of fractures and the results:

Table 1

FRACTURES OF HUMERUS TREATED BY HANGING CAST

Site of Fracture	No. Cases
Above insertion of pectoralis	134
Shaft	145
Involving elbow	26
Total	305

COMPLICATIONS ON ADMISSION

Compound

Above Pectoralis	Shaft	Elbow	Total
1	21	5	27

Complicated by other fractures

Above Pectoralis	Shaft	Elbow	Total
10	17	3	30

Complicated by dislocation of shoulder

Above Pectoralis	Shaft	Elbow	Total
2	1	1	4

Complicated by dislocated elbow

Shaft	Total
1	1

Fracture of greater tuberosity with dislocated shoulder	3
Total complicated	65

Table 2

RESULTS

Above insertion of pectoralis		No. Cases	
Good x-ray and function		74	
Fair x-ray and function		40	
Poor x-ray and function		2	
Rupture and suture of biceps with poor function	1		
Ankylosis of shoulder	1		
Total followed		116	
Not followed		18	
Total treated		134	134
Shaft			
Good x-ray and function		63	
Fair x-ray and function		42	
Poor x-ray and function		6	
Nonunion	2		
Osteomyelitis in compound fractures	2		
Poor function	2		
Total followed		111	
Not followed		34	
Total treated		145	145
Involving elbow			
Good x-ray and function		7	
Fair x-ray and function		8	
Poor x-ray and function (ankylosis)		1	
Total followed		16	
Not followed		10	
Total treated		26	26
Total cases of all kinds treated			305

The following "do nots" contributed by Dr. R. T. Hudson are valuable:

DO NOTS

Do not worry about pain and crepitation the first week.

Do not worry that the fragments move.

Do not let the patient disturb the length of the support.

Do not apply too heavy a cast.

Do not neglect to see that the humerus hangs vertically.

Do not fail to make the patient ambulatory.

Do not allow the patient to attach the cast to the body or wear a sling.

Do not fail to start circumduction exercises of the shoulder after one week.

Do not fail to check with the x-ray after one week.

Do not expect the cast to reduce fractures of the surgical neck.

CONCLUSIONS

(1) The hanging cast has been used by us in over 300 cases of fracture of the humerus.

(2) It is applicable to most fractures of this bone.

(3) The results in our hands have been superior to the conventional methods previously employed.

(4) We feel that primary open reduction, skeletal fixation, recumbent traction or abduction methods are rarely necessary in fractures of the humerus.

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ANESTHETICS AT INCREASED PRESSURE*

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This brief review of anesthesia at increased pressure is the evolution of my own three-fold interest in the subject. In the first place, from the historical standpoint, the use of greater than atmospheric pressures has been one of the major contributions to an understanding of the behavior of inhalation anesthetics. In the second place, from the experimental standpoint (which is also the historical) the biological properties and limitations of any new weak inhalation anesthetic proposed for use can be studied completely only by the inclusion of increased atmospheric conditions in the study. Finally, the use of positive pressure, as well as the degree of pressure to be used, is one of the controversial subjects of modern anesthesia.

With apologies I begin this review by mentioning some of the basic laws having to do with gases and partial pressure. My reason is that in lecturing to medical students and nurse anesthetists I have often been checked by a blank stare of incredulity when I happened to mention a mixture of "100 per cent nitrous oxide and 20 per cent oxygen." That there could be more than 100 per cent of anything seemed to them impossible; that I was referring to pressure greater than atmospheric escaped them entirely.

Four of the basic laws to which I have just referred are of particular importance: (1) The pressure exerted by a mixture of gases is equal to the sum of the separate pressures which each gas would exert if it occupied the whole volume alone ($PV = V\ (p_1 + p_2, \text{etc.})$). (2) Volume is inversely proportional to pressure ($V \propto \frac{1}{P}$, $P \propto \frac{1}{V}$, $PV = P_1 V_1$, $PV =$ a constant). (3) At a constant pressure a gas increases 1/273 of its volume per 1° C. temperature rise from 0°. At a constant volume, pressure increases 1/273 per degree temperature rise from 0°. (4) The amount of gas a liquid will dissolve is directly proportional to the pressure of the gas. The last mentioned law is physiologically applicable to the uptake of anesthetic or oxygen from the alveoli by the blood stream.

HISTORICAL AND EXPERIMENTAL

A few of the data derived from the large amount of experimental work done on the subject of anesthesia at increased pressure are particularly relevant to this brief review. From gradually accumulated experience Paul Bert[1] came to think that it would require about 100 per cent nitrous oxide (with 20 per cent oxygen) to induce anesthesia, and considered the excess pressure to be essential for a proper mixing of the gases.

> He "compelled a dog to breathe a mixture containing 5/6 nitrous oxide and 1/6 oxygen under pressure of 1/5 above atmospheric. The dog soon became insensitive, with muscular relaxation, making it possible to amputate the dog's leg."

The first operation under increased pressure on a human being was done by Labbé February 13, 1878, but the important clinical work was carried out by Bert. Following his experimentation on animals he devised a gas-tight chamber in which the entire operative group could be assembled. In this chamber, with the pressure raised, several operations were done: one for ingrowing toenail, three breast amputations, four bone operations, the extirpation of six tumors, a resection of the infra-orbital nerve, and two reductions of dislocated shoulders. The anesthesia lasted from four to 26 minutes, and induction required from 15 seconds to two minutes. The demonstration was successful, but the set-up was costly and cumbersome and obviously had no place in practical anesthesia.

The criteria of anesthesia were different in those days, it should be remembered, and, as far as we can tell, the patient was considered anesthetized if he did not struggle. In one of Bert's cases the patient "kept talking throughout the operation." We should scarcely call that anesthesia today. Brown, Lucas and Henderson,[2] who repeated Bert's experiments in 1927, considered the older work defective for this reason and stated that the modern concept of surgical anesthesia required something more than that the patient should not struggle.

Bert has stated that spontaneous muscle contractions could be abolished by an increase of 2-3 cm. pressure, that is, to an atmosphere of 780-790 mm. of mercury. In his experiments, as well as in those of Claude Martin,[3] nitrogen was not eliminated from the patient. Even when

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Bert's atmospheric pressure (1 1/5) was used, anoxia was probably a factor in the anesthesia. Brown and his associates believed that anoxia played a large part in the attainment of so-called anesthesia at 760 mm. partial pressure of nitrous oxide. As a matter of fact, 10 per cent oxygen is equivalent to the respiratory handicap 24,000 feet above sea level, at which altitude aviators suffer incoordination and unconsciousness, alone or in combination.

Brown and his co-workers also concluded that the anoxemia accompanying nitrous oxide administration is an essential factor in the anesthesia. In the presence of ample oxygen (16-21 per cent) they were unable to induce anesthesia even with a nitrous oxide partial pressure of 1,320 mm. mercury. The association of a severe degree of anoxemia, which is said to be present in all patients anesthetized with nitrous oxide, in the opinion of some writers, limits use and increases its dangers. On the other hand, these difficulties are largely overcome by the rational modern utilization of depressant medication prior to anesthesia.

Bock,[4] using increased pressure, found that the minimal lethal concentration of nitrous oxide, when adequate oxygen was provided, was about three atmospheres pressure. Our own studies,[5] which show an average figure of 270 per cent, corroborated his work fairly closely. At the same time, incidentally, we established the minimal lethal concentration of ethylene at an average of 156 per cent.

POSITIVE PRESSURE IN MODERN ANESTHESIA

Opinion is in conflict as to the use of positive pressure in modern anesthesia. The tendency in scientific practice is away from excess pressure and wasteful volume, and is definitely toward metabolic and virtually "micro-requirements". In fact, the statement has been made that gas oxygen anesthesia has thrown off many of its early excrescences, of which positive pressure was counted as one. Too much emphasis cannot be placed on the evident truth that positive pressure against expiration must interfere with the elimination of carbon dioxide.

In practice, however, it must be realized that positive pressure (2-5 mm. mercury) has several definite advantages. They have been well summarized by Geoffrey Kaye[6] and others: (1) it increases the alveolar area for oxygen and anesthetic uptake. (2) It prevents dilutional inspiration of unwanted air. (3) It is essential in open chest surgery. (4) It is helpful in dealing with habitual mouth breathing, asthma and an obstructed airway, whether due to a deviated septum or some other cause. (5) It is necessary for open oral work, as in dentistry.

Just what is the safe limit of pressure is still unsettled. Coryllos,[7] working with dogs, has shown that lungs freshly removed from the thorax, are only moderately distended by 15 mm. pressure, and rupture at only 52-58 mm. pressure, but instances of spontaneous pneumothorax and emphysema from much lower pressures continue to be reported.[8-10]

Adams[11] found that positive pressures greater than 24 mm. in dogs or 20 mm. in cats invariably produced mediastinal emphysema and that squeezing the bag could cause an intrabronchial pressure of 25-30 mm. He also called attention to the possibility that laceration of the alveolar walls could take place at pressures much lower than those necessary to damage the visceral pleura.

The use of positive pressure involves several other possible risks. Over-distention of the lungs may dam blood back into the right heart. Forceful inflation can cause diaphragmatic inhibition to the point of death. Positive pressure by way of a mask may cause inflation of the stomach.

Other speculative risks suggest themselves for consideration: unsuspected adhesions might sometimes contribute to a tearing of the visceral pleura. The patient, by coughing or by sudden contraction of the abdominal muscles, might be subjected momentarily to a dangerously high intratracheal pressure during induction of anesthesia with a closed system technic. I question whether we realize how many times we are dealing with unsuspected emphysematous and dangerously thin "blebs." Finally, I question whether we realize the frequency with which spontaneous non-tuberculous pneumothorax occurs in normal life; it is quite possible that a few such accidents might occur coincidentally with the proper administration of an anesthetic.

The question of the safety of anesthesia at increased pressure is thus still undecided. In spite of its usefulness it cannot be denied that it is attended with certain risks. For that reason we welcome any pertinent data from the laboratory, as well as from clinical observations, which will keep patients from being subjected to any unnecessary hazard.

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DISCUSSION (*Abstract*)

Dr. P. K. Knoefel, Louisville, Ky.—I want to speak mostly on the things about which I disagree with Dr. Reynolds. I too am confused by speaking of 100 per cent nitrous oxide and 20 per cent oxygen. I prefer that Dr. Reynolds would talk about the actual pressures of these gases. The anesthetic action of nitrous oxygen is something that needs to be emphasized. There is no doubt that nitrous oxide has an anesthetic action when there is no question of anoxia. This has been demonstrated very well by the Wisconsin group.

In my own experience, in many individuals even as little as 50 per cent nitrous oxide with the rest oxygen will carry the person into the first plane of surgical anesthesia. The chief drawback to the use of a constant, positive pressure with inhalation anesthesia is its effect upon the circulation. When there is an open airway, a positive pressure in the breathing bag is conveyed to the thorax and is exerted on the heart.

The physiologists have studied the circulatory effects of intrathoracic pressures at great length. Beck of Cleveland has done some very pertinent experiments. He found that the raising of the intrapericardial pressure by eight centimeters of water, which is about six millimeters of mercury, led to a fall in the cardiac output of 35 per cent. More important than this probably is the rise in venous pressure which was as much as four centimeters of water often. This is because this pressure is applied to the right auricle and the veins entering it. It is not a question of damming back blood into the right heart so much but from the right heart. When the venous pressure rises as much as this, there is an immediate formation of edema, and in Beck's experiments this is indicated by the blood studies.

It is of particular interest to you, I think, that in Beck's experiments the arterial pressure fell very briefly when this positive pressure was applied to the heart but very promptly rose to normal levels; so simply following the arterial pressure would give you no indication of what was going on here.

This factor alone, the effect on circulation, is enough to condemn the use of positive pressures even as small as these.

Dr. Dougal M. Dollar, Louisville, Ky.—I am very much interested in the positive pressure phase of anesthesia, especially with the use of nitrous oxide. I have found that even for surface work under nitrous oxide it is very hard to maintain any degree of anesthesia for painful procedures unless you do give the gas under pressure, and yet the effect of pressure on the mediastinum and the chest, I think, was demonstrated very forcibly in the chest operations that we do.

It happens that I come in contact with from four to six thoracoplasties or pneumonectomies a week, and we find that while the chest is open and the patient is breathing just in a normal way under the anesthetic, under cyclopropane, with no pressure at all, he gets along very well; but when they start to close, during the closing of the chest with the resulting pressure on the mediastinum, we get into trouble with the anesthetics, especially in lobectomies and pneumonectomies. With the increased pressure on the mediastinum, we get a tremendous fall in blood pressure, and the patients go into shock very frequently until the pressure is relieved by readjustment within.

Unless you use very heavy basal sedation, you cannot maintain any degree of anesthesia without a certain amount of pressure with nitrous oxide. We make a practice of running from eight to ten millimeters of mercury pressure on our nitrous oxide anesthesia in order to maintain them. Even at that we frequently get some cyanosis, and if we do, we switch to a heavier anesthetic.

Dr. R. Douglas Sanders, Louisville, Ky.—It is apparent from Dr. Knoefel's remarks that the chief disadvantage of positive pressure is due to the intrathoracic exertion of it. I am wondering if Dr. Reynolds would express his opinion as to whether or not if apparatus were devised that would exert both extrathoracic and intrathoracic pressure and still allow for access to the field of operation, it would prove to be beneficial. The exertion of partial pressures of anesthetic vapors and oxygen upon the blood would exist as formerly. Such a device could be made of the absorption apparatus with no mask at all. A circulatory thing like a metabolism apparatus could be put into it, and it would be ideal in studying the effect upon laboratory animals and later upon men.

I should like to ask Dr. Reynolds just what sort of relationship exists between nitrous oxide and hemoglobin. Does it actually reduce the oxygen carrying capacity of the hemoglobin, or does it exert a truly anesthetic action upon nervous tissue? I have been told, for instance, that persons could be put to sleep with nitrous oxide and then if, instead of nitrous oxide, nitrogen were put into the atmosphere in the same percentage, they would wake up. That does not necessarily prove that there is not a specific absorptive index of hemoglobin and that it will take up nitrous oxide to the exclusion of oxygen.

Dr. Reynolds (closing).—Although it is true that nitrous oxide is carried in loose combination with hemoglobin, I believe an inert gas would probably not in any way interfere with the oxygen-carrying capacity, if we can think that these things are following the usual physical laws of the gases behaving independently of each other, depending upon their own positive pressure.

You are right about the possible advantage of having an apparatus so constructed that you could have extrathoracic pressure as well as intrathoracic. That unavoidably goes back to Paul Bert in principle, of having the whole operating room at the increased atmospheric pressure. Possibly that same principle might be simplified and made much more practicable than a whole operating room, as such, would be.

I agree with Dr. Dollar that nitrous oxide, while it is a real anesthetic, is a weak anesthetic and without pres-

sure, and without heavy basal premedication, relaxation is not complete. For that reason I am a little bit at a loss to understand the 50 per cent nitrous oxide anesthesia that Dr. Knoefel is talking about. As much as I appreciate the criticism, I cannot conceive from clinical observation that 50 per cent nitrous oxide without basal premedication would approach even the first plane of surgical anesthesia.

I am certainly grateful that you brought out the circulatory effects because I did not stress them at all. I was particularly interested in the spontaneous pneumothorax angle. Circulatory effects, from a physiologic standpoint, are probably usually of greater importance than even a rupture of the lungs, from which recovery can take place.

Most of the anesthetists who are reporting using positive pressure use a very small amount, most of them 3 to 5 mm. That figure is frequently quoted. Sometimes they use up to 8 or 10 mm. of mercury. I do not know how much extra pressure on the heart would be exerted, say, by 5 or 6 mm. of mercury inside the respiratory tract. I have no set opinions on any of this. I cannot understand why lungs should explode inside of a closed, smooth, thoracic cage because somebody happens to be giving an anesthetic, when every freshman or sophomore medical student blows against a mercury manometer to see how much power he has and blows the pressure up to virtually his own blood pressure, and in twenty some odd years I have never had a medical student explode yet. Still we keep talking about rupture of the lungs while working with less than 10 mm. of mercury.

Dr. C. W. Hoeflich, Houston, Tex.—I will admit my ignorance, but why do they use nitrous oxide and not mix in either one of the other two gases?

Dr. Reynolds (closing).—I had no intention of advocating the use of nitrous oxide. That was just chosen as an example of probably the least anesthetic of the gases, the one where pressure would be indicated. Nitrous oxide is not quite so powerful an anesthetic as ethylene, and not to be spoken of in the same breath as cyclopropane.

Southern Medical Journal

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M. Y. DABNEY, M.D., Editor
C. P. LORANZ, Secretary, Treasurer and General Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-Fifth Annual Meeting
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LIVER CANCER

Experimental malignant tumors of the liver were produced ten years ago by feeding a coal tar product, o-aminoazatoluene, to animals on a basal diet of rice; and it was reported a few years later that tumors did not develop if wheat flour were substituted for the rice of the ration. In 1937 it was noted that liver cirrhosis and cancer developed more rapidly if dimethylaminoazobenzene, butter yellow, were used instead of the first mentioned coal tar product. With butter yellow also, cancer incidence was reduced by providing a basal diet of wheat instead of rice.[1]

Thinking it possible that wheat contained a factor antagonistic to cancer development, Suguira[1] investigated wheat germ oil as a source of the preventive factor. A wheat germ oil rich in vitamin E but poor in B_2 had no delaying activity upon the tumor growth. Very nearly all the rats which were given rice, wheat germ oil and butter yellow developed cancer within three to six months after the beginning of the experiment.

1. Suguira, Kanematsu: Effect of Feeding Wheat Germ Oil on Production of Liver Cancer by Butter Yellow. Proc. Soc. Exper. Biol. & Med., 47:17 (May) 1941.

Gyorgy, Poling and Goldblatt,[1] of Western Reserve University, fed several groups of rats butter yellow with a basal diet of rice, carrots, and vitamin B supplements and obtained the expected malignant liver changes in practically all the experimental group. If the ration was modified to include more casein, cystine and choline, it afforded a degree of protection. Also the cancers did not develop if rice were omitted from the ration, other changes being made at the same time.

One might think that rice itself had some carcinogenic property were it not for the fact that cancer incidence is not increased in the oriental races which live largely on rice. There is also the fact that the diets used are still necessarily complicated. The experiments continue to confirm the fact that incidence of a specific irritation cancer of the liver may be controlled by modification of the diet, and that a milk product, among other food materials, seems to be beneficial.

ALCOHOLISM AS A PUBLIC HEALTH PROBLEM

The effects of chronic alcohol intoxication have been studied by physiologists, chemists, psychiatrists, criminologists and many others in recent years. A symposium upon the subject conducted last year before the American Association for the Advancement of Science and reviewed in the last number of the *American Journal of Psychiatry*,[2] presents much of the current attitude and information upon it.

This is a subject of tremendous general importance and concerns a disease without specific treatment. Drinking began with the earliest history of man. Now,

"It is culturally imperative to toast the bride, christen the ship, seal the bargain, speed the friend, salute the New Year, celebrate good fortune, wake the dead and even symbolize and ingest the blood of the Savior through the medium of alcohol. * * * Social habits which develop in response to cultural sanctions cannot be eliminated by sumptuary legislation * * * the failure of prohibition is eloquent testimony of the essentially alcoholic nature of contemporary American culture."[3]

From a medical and psychiatric viewpoint,

"Although the enlightened of today recognize excessive

1. Gyorgy, Paul; Poling, E. C.; and Goldblatt, Harry: Necrosis, Cirrhosis and Cancer of Liver in Rats Fed a Diet Containing Dimethylaminoazobenzene. Ibid., p. 41.

2. Moore, Merrill: Alcoholism: Some Contemporary Opinions. Amer. Jour. Psychiat., 97:1454 (May) 1941.

3. Shalloo, J. P.: quoted by 2.

and prolonged use of alcohol as a disorder of conduct, a disease, in some instances at least amenable to treatment, it is a fact that throughout the United States, with the exception of the large cities, practically the only institution in which an acutely intoxicated person may be cared for is the local jail. * * * The statistics of arrest indicate that annually well over 100,000 persons are arrested on a charge of drunkenness, about 27,000 on a charge of driving an automobile while under the influence of liquor, and about 27,000 on a charge of disturbing the peace, an offense often associated with over-indulgence in alcohol. In addition, over 4,900 persons were committed to mental hospitals in 1938 by reason of alcoholic psychosis; statistics are not available as to the number admitted to the alcoholic wards of the various municipal hospitals. * * * Thus, with tuberculosis, cancer, syphilis, mental disease and infantile paralysis receiving competent and intelligent medical attention, we now have alcoholism as the greatest public health problem at the present time, which is not being systematically attacked."[4]

Many studies have been made upon the physiologic effects of alcoholism and the fact that it can cause cirrhosis of the liver is the most clearly established. Various food deficiency syndromes are associated with it and injury to the gastric mucosa. A legal test for drunkenness is not yet established.

There are brain changes, as shown at autopsy.

"Almost all brains from chronic alcoholic patients show shrinkage (atrophy or pseudo-atrophy), most markedly of the frontal lobes, with corresponding increase of fluid in the subarachnoid space referred to as edema. This gross shrinkage of the brain may be due to loss of brain substance from degeneration, to dehydration, or to a combination of both factors."[5]

This possibly explains the character deterioration which always accompanies chronic alcoholism, the subject becoming increasingly untruthful and egocentric as he becomes more determined to obtain the desired stimulant and to justify his intemperance.

The number of total abstainers is probably greater in America than in any other complex civilization and here it is perhaps increasing.

Treatment should be preventive, should begin as instruction in the home and in the schools and should be emphasized in the colleges where much alcohol addiction begins. Examples of the effects upon physical development and morality should be cited. The student who contemplates only social drinking should be taught that the heavy drinker is recruited only from the ranks of the moderate drinkers; that no one ever starts drinking with the intention of becoming a drunkard; and that drunkards are never recruited from abstainers. The student should refrain entirely from intoxicating beverages, as he has no possible way of knowing his future power of resisting alcohol, whose habit-forming tendency is second only to the opiates.

4. Overholser, Winfred: quoted by 2.
5. Alexander, Leo: quoted by 2.

VITAMIN E AND MUSCLE

Deficiency of the fertility vitamin E, in the growing rat results for a long period in no prominent symptoms except sterility. There is a slight retardation of growth. After many months on the deficient diet, paralysis of the rear limbs develops. At times microscopic changes in the muscle fibers may be detected before the appearance of gross lesions, but these are not conspicuous.

The young rabbit, in contrast, shows marked muscular symptoms of E deficiency in three to six weeks. Successive rapidly developing effects of the deficiency are an abnormal creatinuria, decreased rate of growth, loss of weight, muscular weakness, inanition and death, with extreme necrosis of the skeletal muscle fibers.

Mackenzie and McCollum[1] attempted to determine whether the testes or muscles of rabbits are more susceptible to E deprivation. Animals kept on a partial E deficiency, they say, grow for months eating well and without apparent symptoms, except that the urinary creatine is elevated and histologic examination reveals extensive microscopic lesions in the skeletal muscles. The testes of both the chronic and acute deficiency groups, were nearly always normal.[1] This was in marked contrast with those of rats reared on E deficiency diets, which show early testicular degeneration. In rabbits the condition of the testes was not an indication of dietary adequacy of vitamin E. The skeletal muscles revealed the deficiency early, as did urinary creatine determinations.

This work, of course, further emphasizes species differences in response to a vitamin deficiency and would seem to show that the muscular system may remain normal after testicular degeneration, or degenerate in the presence of histologically normal testes. The paralysis of vitamin E deficiency is dependent upon degeneration of the leg muscles.

1. Mackenzie, C. G.; and McCollum, E. V.: Muscular Dystrophy in the Absence of Testicular Degeneration in Vitamin E Deficiency. Proc. Soc. Exper. Biol. & Med., 47:148 (May) 1941.

TWENTY-FIVE YEARS AGO

From Journals of 1916

Infantile Paralysis in New York.[1]—Reports from New York indicate that that city is making desperate efforts to check a beginning epidemic of anterior poliomyelitis, probably the most severe in its onset of any that has threatened the American communities. ¶Since June 10, there have been 327 cases reported in Brooklyn with a mortality of about 20 per cent. * * * The known cases are for the most part confined to the Italian population.[2] ¶A particularly perplexing feature of the disease is the remarkable incidence in rural districts.[3] ¶For the week ending July 8, 892 cases have been reported with 205 deaths.[4] ¶Secretary of the Treasury McAdoo on July 11 asked for an appropriation of $135,000 to be used in the prevention of an interstate spread of infantile paralysis.[5]

English Physicians in the War.[6]—The removal of several millions of the best lives [soldiers] from the panel lists and their replacement by women workers who require much greater attention for the same payment has particularly affected panel doctors. The calling up of so many men, especially married men, has left enormous numbers of wives, children, old fathers and mothers and other dependents to the generosity of the doctors. * * * It is not so much the actual loss inflicted on it that calls for protest as the lack of understanding and appreciation of the big burden the profession has shouldered.

Plattsburg Camp.[7]—The first camp of instruction for medical men was opened at Plattsburg, New York, July 12, with Major Windetertt, U. S. Army, in charge. The second camp will open July 24. * * * The number of applicants for each camp is limited to 200.

Disinfecting Wounds.[8]—Dr. L. Cheinisse of Paris drew attention to the excellent results that can be obtained by the treatment of certain wounds with iodine fumigations.

1. Editorial. J.A.M.A., 67:127, 1916.
2. Medical News. Ibid., p. 129.
3. Ibid., p. 202.
4. Ibid., p. 211.
5. Ibid., p. 212.
6. Brit. Med. Jour., Pt. 2, p. 51, July 8, 1916.
7. J.A.M.A., 67:294, 1916.
8. Ibid., p. 369.

Book Reviews

An Introduction to Dermatology. By Richard L. Sutton, M.D., Sc.D., LL.D., F.R.S. (Edin.), Emeritus Professor of Dermatology, University of Kansas School of Medicine, and Richard L. Sutton, Jr., A.M., M.D., L.R.C.P. (Edin.), Assistant Professor of Dermatology, University of Kansas School of Medicine. Fourth Edition. 904 pages, illustrated. St. Louis: The C. V. Mosby Company, 1941. Cloth $9.00.

The well known and very complete work is now in its tenth edition and has reached monumental dimensions. The Suttons have condensed their latest large volume and present it as the fourth edition of their "Introduction to Dermatology."

As the authors say, it contains a review of dermatology sufficient to outline the scopes of the specialty beyond provincial boundaries. It contains considerably more than a student may encompass.

The volume is full sized, attractive and well edited. The illustrations are unusually good, both the clinical and the microscopic.

The views set forth are the up-to-date ones generally accepted by modern medicine. Moreover, the Suttons do not hesitate to give their own views, especially in regard to therapy. For instance, in the management of acne vulgaris they advocate a low fat diet and small doses of thyroid extract. The book closes with a well chosen bibliography of 36 pages.

Fractures. By George Perkins, M.C., M.Ch., Oxon., F.A.C.S., Assistant Orthopedic Surgeon to St. Thomas' Hospital. London: Oxford University Press. 384 pages, illustrated. Cloth $6.50.

This book is unique in that it has no preface or introduction. The author is living in a country which is in an upheaval of war, but he finds time to contribute to the progress of orthopedic surgery.

The book has no photographs, but has excellent sketches giving in detail different types of fractures and also different technics in the treatment of fractures.

It adds little, if anything, to the recent knowledge of the treatment of fractures. It is disappointing that there is no discussion of new technics in the treatment of military fractures. It is merely another contribution of a small volume on the treatment of fractures like many others which are filling the literature today. It contains the usual outline and abstract of treatment of fractures, and does not always give the physician sufficient information for adequate treatment.

Diagnosis and Treatment of Arthritis and Allied Disorders. By H. M. Margolis, M.D., M.S. (in Med.), F.A.C.P., Chief, Arthritis Service, St. Margaret Memorial Hospital. New York: Paul B. Hoeber, Inc. 551 pages, illustrated. Cloth $7.50.

Since 5 per cent of the population suffers from some form of rheumatism, this disease is a serious economic and social, as well as physical problem.

This practical volume will be of great service to the family physician. It presents the classification of the arthritides, with treatment appropriate to each type. The various new as well as old methods are carefully appraised. Of special value will be found the chapters dealing with the prevention and correction of deformities that follow chronic arthritis.

It is a well-planned discussion, embracing all the recent developments in this universal and crippling disease. No recent text on this subject will give the general practitioner more practical suggestions.

Careers in Anesthesia. Careers published by the Institute for Research, Chicago. $1.00.

In this brochure are described the early days of anesthesia and its more recent development. Formerly an anesthetic was like a dose of medicine. Anybody could

give it. Today the numerous agents, ether, the various gases, basal anesthesia, and so on, call for a well-trained personnel. The qualifications for both the department and the anesthetist are given. A college curriculum is exhibited and the possibilities of earnings and advancement in this specialty are described.

The Therapy of the Neuroses and Psychoses. By Samuel Henry Kraines, M.D., Associate in Psychiatry, University of Illinois, College of Medicine. 512 pages. Philadelphia: Lea & Febiger, 1941. Cloth $5.50.

This book is written primarily for the general medical practitioner with the purpose of giving him an understanding of the neurotic and psychotic patients who comprise a large portion of his practice.

The approach to the problems of the neuroses and psychoses is eclectic with an attempt to synthesize all good present day psychiatric theory and practice into one body of knowledge. There is a marked acceptance of the psycho-biologic principles of Adolph Meyer and a rejection of many of the psycho-analytic principles of Sigmund Freud. The rejection of psycho-analysis, however, is more apparent than real, as much of psycho-analysis theory, vocabulary and formulations are incorporated into the author's synthesis.

The material is well presented in an easy readable style, amply illustrated by relevant and concise case histories. Treatment is stressed throughout and therapeutic technics and principles are discussed in detail.

The value of such a book lies in the fact that the neuroses are seen first by the general practitioner and frequently in areas where expert psychiatric aid is not available. In addition, if sound psychiatric principles are understood and utilized by the general practitioner, many of the less severe neuroses could be treated by him with good therapeutic results.

This book is recommended to everyone who desires to practice medicine in the light of present day psychiatric knowledge.

The Neuroses in War. By Several Authors Under the Editorship of Emanuel Miller, M.A. (Cantab.), M.R.C.P., D.P.M. (Cambs) with a Concluding Chapter by H. Crichton-Miller, M.D., F.R.C.P. 250 pages. New York: The Macmillan Company, 1940. Cloth $2.50.

This timely book, written by a number of contributors, reviews the subject of the war neuroses based chiefly on the experiences and considered opinions of the last war. Due consideration is given the fact that present day warfare is no longer restricted to men in active service. A resume of the literature on the subject is followed by chapters on the mechanism and symptomatology of the psychoneuroses, methods of treatment and the psychiatric organization in the services. An appendix includes additional data on the experiences of the last war, pharmacology and the treatment facilities for civilian psychoneurotic casualties. Some of the subject matter is controversial as may be expected in a work of this type, but on the whole the book is well composed, confined to accepted opinions, and written in a clear, readable style. A chapter devoted to the "war of nerves" attempts to explain some of the essential factors involved in this potent weapon of present day "all out warfare." This is by no means a new human experience, but never before have its potentialities been so extensively explored as during the present war. An attempt is made to acquaint the physician with those individuals possessing a mental equipment and disposition which make them unsuited for the services. At the same time a plea is extended for sympathy and a better understanding of those who are asked to face not only death but the fear of death.

This book should be read with considerable interest and profit by any physician, in or out of the service.

Neuro-Ophthalmology. By R. Lindsay Rea, B.Sc., M.D., M.Ch., F.R.C.S., Ophthalmic Surgeon to West End Hospital for Nervous Diseases; Ophthalmic Surgeon to London Lock Hospitals. Second Edition. 688 pages, illustrated. St. Louis: The C. V. Mosby Company, 1941. Cloth $13.50.

The second edition of "Neuro-Ophthalmology" is, in reality, not a second edition, but the first edition with a 110-page appendix added to the end. This addendum is divided into chapters and sub-chapters which correspond with the divisions in the original book.

Of especial interest are the chapters dealing with pupillary changes, the muscles and nerves of the eye, papilledema, retinitis pigmentosa, and intracranial aneurysms. There is too much extraneous material. Included in the book are sections on ocular anesthesia, electro-encephalography, tumors of the optic nerve, tumors of the retina, sulfanilamide, and vitamins in ophthalmology. These make interesting medical reading, but cannot be considered neuro-ophthalmology. Similarly, the author devotes too much space to neurologic conditions which have a minor ocular manifestation.

Dr. Rea has written the best book in its field. It should be on the shelf of every oculist and neurologist. If it were condensed to about one-half or two-thirds its present size, it would be an outstanding medical text.

Age Morphology of Primary Tubercles. By Henry C. Sweany, M.D., Medical Director of Research, Municipal Tuberculosis Sanitarium, Chicago. 265 pages, illustrated. Springfield, Illinois: Charles C.. Thomas, publisher, 1941. Cloth $5.00.

This excellent monograph discusses clearly and scientifically an important part of the tuberculosis picture which has, up to now, been sadly neglected. One is impressed with the years of patient, careful study which have been done to show the relationship of time to the development of tuberculous lesions, particularly the primary tubercle.

The book proves the theory that most tuberculosis progresses with a fairly definite morphology. A significant relationship is shown to exist between the age of primary tubercles and their x-ray and physical appearance.

Dr. Sweany's work is well illustrated by many case histories, antemortem and postmortem x-rays and specimens.

Pathologists, roentgenologists and phthisiologists will find in this book an answer to the everyday question of how old is a tuberculous lesion.

A Practical Manual of Diseases of the Chest. By Maurice Davidson, M.A., M.D. (Oxon.), F.R.C.P. (Lond.), Physician to the Brompton Hospital for Consumption and Diseases of the Chest (Sometime Dean of the Brompton Hospital Medical School). Second Edition. 575 pages, illustrated. London: Oxford Medical Publications, 1941. Cloth $13.50.

This book deals with respiratory diseases, the main emphasis being placed upon diagnosis and treatment. Over forty definite detailed prescriptions are given.

The text is balanced by numerous x-rays, case histories and other illustrations.

This book is recommended as practical and up-to-date.

Oral Pathology. A Histological, Roentgenological, and Clinical Study of the Diseases of the Teeth, Jaws, and Mouth. By Kurt H. Thomas, D.M.D., Professor of Oral Surgery and Charles A. Brackett, Professor of Oral Pathology at Harvard University. 1,306 pages, 1,370 illustrations, 137 full color. St. Louis: The C. V. Mosby Co., 1941. Cloth $15.00.

The authors present a most comprehensive study on all phases of oral pathology, beautifully written and illustrated. Experimental pathology covering hereditary, endocrine and nutritional influences on development of the teeth and jaws; developmental abnormalities of the teeth and jaws; developmental abnormalities of the head; functional changes of the teeth; traumatic injuries of the teeth; periodontal diseases; extension of periodontal infections; diseases of the jaws; tumors of the jaws and oral mucosa; diseases of the oral mucosa, lips and tongue; and diseases of the salivary glands and mucous glands are completely discussed.

Pathogenesis; clinical, pathological and roentgenological findings; treatment and prognosis are presented. The chapters on infectious diseases and tumors of the jaws and soft tissues are beautifully illustrated in color photography.

The book is written especially for those persons limiting their practice to dentistry, oral surgery and otolaryngology, but should be most instructive to all physicians.

America Organizes Medicine. By Michael M. Davis, Ph.D., Chairman, Committee on Research in Medical Economics. 335 pages. New York: Harper & Bros. Cloth $3.00.

This is a most interesting volume. Under the emphasized phrases "Organization and Administration" the author argues for a complete regimentation of medical and surgical practice. He denies that the death rate is even a rough index to the morbidity rates and urges a more general adoption of medical practice long in vogue in Germany and England, although the American death rate is better than theirs. He belittles all arguments opposing his scheme as emotional piffle and refers to "sacred personal relationship between patient and physician," "choice of physician," and so on, with the contempt of all special pleaders. He disclaims any desire for Federal control of practice, but belittles state licensure. He dismisses "malingering" with less than five lines. He intimates that physicians are actuated by selfish desires. He praises much of the work of the American Medical Association, but bitterly condemns it for not seeing "medical service" as he does.

His scheme would put physicians in politics and soon increase the demand for pensions. He ignores the "eight-hour day" danger, the evil of standardizing all personal services and the certain lowering of medical and surgical skill by transferring the selection of physicians to lay judgment.

He would not argue about physicians as Elbert Hubbard did in his Essay on Clara Barton, but many pages bear suspicious evidences of distrust. One sometimes wonders if the writer may be as much interested in lowering the cost of medical care for the upper fifth of the population as for the lower fifth.

The book is well written, has a good index, and in the main is free of printing errors. The author's plan would add greatly to the cost of medical care without increased adequacy and would probably impair the higher standards of efficiency achieved through the organized profession during the past four decades.

Graduate Medical Education. Report of the Commission on Graduate Medical Education, 1940. 304 pages.

This book contains the report of a commission set up to study the available facilities for graduate medical education and to establish recommendations as to the best plan to be followed in this important field of medical education. The internship is first considered in considerable detail, and there is then a discussion of the medical residency of postgraduate medical education as available to practitioners and of the specialty boards. The final part of the book deals with a consideration of postgraduate medical education in Great Britain.

The various problems involved are discussed in considerable detail. Senior medical students will be considerably aided in their choice of internship if they read the some sixty pages in this book dealing with this subject. Here the pros and cons of long versus short, rotating versus straight internships are discussed at considerable length and the teaching responsibilities which a hospital should have toward an intern is emphasized. The problem of the residencies in various specialties is discussed similarly.

The book represents a crystallization of the opinions of a group of prominent medical educators and the advice given and suggestions offered are probably, in most respects, as good as can be obtained. There is perhaps one unavoidable flaw in some of the conclusions reached and this is that there tends to be too much emphasis on system and not enough emphasis on the importance of postgraduate training being carried out in relation to institutions which have outstanding individuals. In general, a hospital which has on its staff outstanding individuals who devote a reasonable amount of time to contact with the house staff will result in better instruction than another institution which perhaps has a better planned system of instruction for the house staff but lacks a first-rate visiting staff to administer the system. The difficulty is that all too often the ablest members of the visiting staff become so busy with their own practice that they have relatively little time to devote to the instruction of the interns and residents.

The section dealing with postgraduate instruction for practitioners considers this from two different points of

view, namely: education for specialists and education for general practitioners. Any physician planning to leave his practice and spend a period in postgraduate education can profit by reading the section dealing with these subjects in the book.

One of the most useful features of the book is a competent discussion of the problems now confronting the various specialty boards.

Textbook for Male Practical Nurses. By Gayle Coltman, R.N. 215 pages, illustrated. New York: The Macmillan Company. Cloth $2.00.

The various types of hospitals and their organization and the primary duties of the nurse are described. Chapters include methods of admitting and discharging patients, how to "open" and "close" a bed, care of critical cases, isolation precautions, the use of appliances, enemas, descriptions of the simpler diagnostic measures and the giving of medicines.

The book will be most serviceable to the beginner rather than to the more advanced student.

The Merck Index: An Encyclopedia for the Chemist, Pharmacist, Physician, Dentist and Veterinarian. Fifth Edition. 1160 pages, illustrated. Rahway, New Jersey: Merck & Company, Inc. Cloth $3.00.

A tremendous amount of the labor of experts is represented in the compilation of this excellent chemical reference work. About the size of the usual medical dictionary, it contains names, descriptions and formulae of every chemical which has any medicinal or pharmaceutical use. It is by no means an advertisement of products of a single manufacturer.

The anesthetics such as cyclopropane, the numerous barbiturates, vitamins as the several B's and D's, hormones as the estrogens and androgens and progesterone are accurately described and the structural formulae are given. A defect from the physician's point of view is the fact that proprietary names are not distinguished from non-proprietary. There are tables of atomic weights, solubilities, melting points, boiling and freezing points. There is an alphabetical list of useful clinical and chemical reactions, by name and by the author's name; a list of culture media and methods of preparation, staining methods, antidotes for poisons, and a great deal of other valuable data. The arrangement makes the wealth of information readily available.

This is a splendid reference work for physicians and research workers, gotten out by one of the oldest, largest and most outstanding chemical manufacturing firms in America.

Health in Handcuffs. By John A. Kingsbury. 210 pages. New York: Modern Age Books, 1939. Paper 75 cents.

A propaganda brochure for socialized medicine and the Wagner Bill. Cleverly written, the A.M.A. is a "bogey" man, and organized medicine is keeping the nation from "adequate" medical care, whatever that is. The author also fails to understand that over 85 per cent of the members of the medical profession are unfavorable to this type of practice and that the American Medical Association is a democratic organization of practicing physicians.

Southern Medical News

SOUTHERN PEDIATRIC SEMINAR

The Southern Pediatric Seminar will hold its twenty-first annual session at Saluda, North Carolina, July 21-August 2. The Seminar is "a postgraduate summer course in methods of diagnosis, prevention and treatment of diseases of children." The faculty this year will be made up of thirty-one outstanding physicians in their line of work in the South. Saluda is "in the Land of the Sky," in the very heart of the Blue Ridge Mountains—an ideal place for such a teaching facility as the Seminar. Dr. Samuel F. Ravenel, Greensboro, North Carolina, is Dean; Dr. Frank H. Richardson, Brooklyn, New York, and Black Mountain, North Carolina, is Vice-Dean; and Dr. D. Lesesne Smith, Infants' and Children's Sanitarium, Saluda, North Carolina, is Registrar. For program and further information, address the Registrar.

ALFRED I. duPONT INSTITUTE

The Alfred I. duPont Institute of The Nemours Foundation for Crippled Children at Wilmington, Delaware, was dedicated Saturday afternoon, June 14. The Institute was created in the will of the late Alfred I. duPont and is a charitable institution for crippled children with special funds and set-up for research. The Medical Director and Head of the Institute is Dr. Alfred R. Shands, Jr., formerly Professor of Orthopedic Surgery, Duke University School of Medicine, Durham, North Carolina, and a former Chairman of the Section on Bone and Joint Surgery of the Southern Medical Association. The Medical Advisory Board is composed of Dr. Thomas R. Brown, Chairman, Baltimore, Maryland; Dr. George E. Bennett, Baltimore, Maryland; Dr. DeWitt B. Casler, Baltimore, Maryland; Dr. William T. Graham, Richmond, Virginia; Dr. Michael Hoke, Beaufort, South Carolina; Dr. Beverley R. Tucker, Richmond, Virginia; Dr. Robert B. Osgood, Boston, Massachusetts; and Dr. Philip D. Wilson, New York, New York. Mrs. Alfred I. duPont is President of the Board of Trustees. At the dedication Dr. Shands spoke on "Alfred I. duPont Institute of The Nemours Foundation," and Dr. Francis P. Gaines, President, Washington and Lee University, Lexington, Virginia, spoke on "Alfred I. duPont, The Man." The Southern Medical Association was represented at the dedication by Mr. C. P. Loranz, Secretary and General Manager, Birmingham, Alabama.

ALABAMA

The Associated Industries of Alabama, with the cooperation of the National Association of Manufacturers, held a clinic on "Health in Industry" at Birmingham on June 20 at the Mountain Brook Country Club. At the luncheon Dr. Victor G. Heiser, New York, Consultant on Healthful Working Conditions for the National Association of Manufacturers, spoke on "Industrial Health and National Defense." Mr. Wallace L. Caldwell, President, Associated Industries of Alabama, Birmingham, presided. Taking part in the panel discussion were Dr. Lloyd Noland, Medical Director, Tennessee Coal, Iron & Railroad Company, Fairfield; Dr. J. M. Wetherhold, Resident Doctor, Alabama Ordnance Works and E. I. duPont de Nemours & Company, Incorporated, Childersburg; Mr. Chas. A. Miller, Director of Safety, The Texas Company, Houston, Texas; and Mr. Harvey Saul, Director, Employment Relations Department, National Association of Manufacturers, New York, New York.

Medical Association of the State of Alabama, at its recent annual meeting, held in Mobile, elected Dr. James M. Mason, Birmingham, President; Dr. John Paul Jones, Camden, Dr. Roscoe C. Stewart, Sylacauga, Dr. John S. Tillman, Clio, and Dr. Merle E. Smith, Parish, Vice-Presidents; and Dr. Douglas L. Cannon, Montgomery, Secretary-Treasurer, reelected. Montgomery was chosen for the 1942 meeting place.

Dr. J. E. Garrison, for twenty-nine years Chief of the Obstetric and Gynecologic Service of the Salvation Army Maternity Hospital, Birmingham, resigned April 30, but will continue in private practice and as Consultant to the hospital. Succeeding him are Dr. Cecil D. Gaines in obstetrics and Dr. Gilbert F. Douglas in gynecology, both of Birmingham.

The thirtieth annual clinic and twenty-fourth annual meeting of the John A. Andrew Clinical Society (negro physicians) was held at the John A. Andrew Memorial Hospital, Tuskegee Institute, on April 6-12.

Continued on page 34

Diarrhea in Infancy

Take It In Time

Just a day or two of light nourishment prepared from Mellin's Food as suggested below will usually avert an intestinal disturbance that might develop into a serious diarrhea if not taken in hand at the first appearance of loose stools.

Mellin's Food* . . 4 level tablespoonfuls
Water (boiled, then cooled) . . . 16 ounces

Give one to three ounces every hour or two until the stools lessen in number and improve in character.

The mixture may then be strengthened by the gradual substitution of boiled skimmed milk for water until the quantity of skimmed milk is equal to the normal quantity of milk used in the baby's formula. Finally the fat of the milk may be gradually replaced by skimming less and less cream from the milk.

Samples sent to physicians upon request.

Directions for using Mellin's Food are left entirely to the physician.

Mellin's Food Company, Boston, Mass.

**MELLIN'S FOOD: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate — consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.*

Continued from page 788

The Alabama State Department of Health recently added to its staff Dr. Archibald M. Gaulocher, Wingdale, New York, for eleven years on the staff of the Central Islip State Hospital, New York. He will be in charge of the Division of Mental Hygiene of the State Department of Health.

Dr. Richard C. Woodson and Miss Catherine Wall, both of Birmingham, were married recently.

Dr. James B. Hicks, Gadsden, and Miss Dagny Magnhild Everson, Elliott, Missouri, were married recently.

ARKANSAS

Independence County Medical Society has elected Dr. V. D. McAdams, Cord, to fill the unexpired term of the late Dr. I. M. Huskey as Vice-President.

Arkansas Medical Society has appointed to its State Medical Board Dr. J. T. Matthews, Heber Springs; Dr. D. L. Owens, Harrison; Dr. J. B. Jameson, Camden; Dr. E. A. Callahan, Carlisle; and Dr. L. J. Kosminsky, Texarkana.

Dr. D. W. Goldstein, Fort Worth, has received a certificate of distinguished service from the American Society for the Control of Cancer for five years of service with the Women's Field Army.

Dr. Chas. S. Holt, Fort Smith, was elected Trustee of the Mid-West Hospital Association at its recent meeting in Kansas City, Missouri.

Dr. R. M. Eubanks, Little Rock, has been appointed to the Board of the State Tuberculosis Sanatorium.

Dr. Lawrence Zell, Little Rock, has accepted an appointment with the United States Public Health Service, Washington, D. C.

Dr. W. B. Grayson and Dr. G. D. Thompson, Little Rock, have been appointed to the State Board of Cosmeticians.

Dr. George B. Fletcher, Hot Springs, has been appointed to the Board of the State Hospital for Nervous Diseases.

Dr. A. M. Elton, Newport, has been appointed a Trustee of the Arkansas State Teachers' College.

Dr. Hoyt R. Allen, Little Rock, and Dr. R. B. Robins, Camden, have been elected Directors of the Little Rock Executive Club.

Dr. Foster Jarrell, Hot Springs, has been appointed Garland County Coroner.

Dr. C. H. Finney, Fort Smith, has been ordered to active duty with the Army Medical Corps and assigned to Camp Snelling, Minnesota.

Dr. E. H. White, Little Rock, has been appointed Chairman for Arkansas of the American Committee of Maternal Welfare.

Dr. L. F. Barrier, Little Rock, has been appointed to the Board of McRae Memorial Sanatorium.

Dr. Gean S. Atkinson has been elected President of the Manila Lions Club.

Dr. R. H. Johnston, Clarksville, has reported for active duty with the Army Medical Corps and is stationed at La Garde Hospital, New Orleans, Louisiana.

Dr. N. R. Hosey has moved from Joiner to Helena.

Dr. N. T. Hollis, Little Rock, has been appointed Acting Superintendent of the State Hospital for Nervous Diseases.

Dr. E. R. Barrett has moved into new offices in Jonesboro.

Deaths

Dr. Louise Krauss Ament, Siloam Springs, aged 66, died recently.

Dr. Robert S. Foster, Carolan, aged 72, died recently.

Dr. Jesse P. Randolph, Hot Springs National Park, aged 63, died recently of arteriosclerosis.

Dr. Simeon J. Hesterly, Prescott, aged 78, died May 2.

Dr. Stephen S. Jones, Calico Rock, aged 70, died May 7 of coronary disease.

Dr. A. R. Lord, Florence, aged 83, died May 6.

Dr. A. L. Wilsford, Moro, aged 72, died May 16.

Dr. William J. Robinson, Portia, aged 76, died recently of chronic nephritis.

Dr. Lee Zuber, Sweet Home, aged 75, died recently.

Continued on page 36

DR. MOODY'S SANITARIUM

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For Nervous and Mental Diseases, Drug and Alcohol Addiction and Nervous Invalids Needing Rest and Recuperation

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Superintendent

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ADMISSION: A college degree based on four years of college work including certain specified science and language courses is required.

For full information, address The Dean, The Jefferson Medical College, Philadelphia, Pa.

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WAS AND STILL IS THE OUTSTANDING SOURCE OF THE FULL VITAMIN B COMPLEX SUPPLYING THE FULL OF GOLDBERGER'S P-P (PELLAGRA-PREVENTIVE) FACTOR

Since the Mississippi flood in 1928, Vegex-Vitafood Dried Brewers' Yeast has increasingly become the outstanding source of Goldberger's P-P (pellagra-preventive) factor, particularly among health departments and physicians.

Initially, the President of the Company, with a long experience in food and drug administration, the author of one of the first, if not the first, of the laws against medical advertising frauds, determined to and did place the use of this yeast entirely under the direction of physicians and health departments. It has been, with the physician's other treatment, a dependable aid in lowering the pellagra death rate as comparative vital statistics are showing.

And Then

Another outstanding thing has been done. It has been demonstrated that when a product is supplied at a price which people of low incomes can pay, supplied through the wholesaler and retailer and then all treatment directed to the neighborhood physician and health department, a fatal scourge, even during the depression, through the private practitioner, is being conquered.

The Two Types

There are two types of Vegex-Vitafood Dried Brewers' Yeast, the Red Label has the hop flavor removed; the Green Label retains the hop flavor. Both types are packed in one-half pound, one, two and five pound cans or fifty and one hundred pound bags.

This yeast assays 50 International B_1 units per gram and 40 Sherman-Bourquin B_2G (riboflavin) units per gram and supplies the whole of the vitamin B complex. It is high in Goldberger's P-P (pellagra-preventive) factor including the nicotinic acid fraction.

Suggested Administration

A simple and satisfactory way for administration is a tablespoonful stirred into a glass of cold water. The debittered type is furnished in 6 grain tablet form. However, in pellagra, the powder is preferable since the daily dose would require from thirty to sixty tablets.

Vegex

Vegex is the condensed extract of approximately the whole contents of the yeast cell in a more palatable and more available form. It is meat-like in flavor—but meat free—giving wide and tasty food uses. The simplest way of serving Vegex is to dissolve a scant teaspoonful of the paste into a cup of hot water—chill in summer—or hot milk.

●

Samples for clinical or professional use will be sent on request.

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Continued from page 34

DISTRICT OF COLUMBIA

American Congress of Physical Therapy will hold its twentieth annual scientific and clinical session at the Mayflower, Washington, September 1-5, inclusive. Dr. Nathan H. Polmer, New Orleans, Louisiana, is President, and Dr. A. R. Hollender, Miami Beach, Florida, is President-Elect. For program and information, address American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

American Occupational Therapy Association will hold its twenty-fifth annual meeting at the same time of the American Congress of Physical Therapy, September 1-5, at the Mayflower, Washington. For program and information, address Mrs. Meta R. Cobb, 175 Fifth Avenue, New York City.

The American College of Physicians, at its last annual session, held in Boston, elected the following members of the Medical Society of the District of Columbia Fellows of the College: Dr. Alva D. Daughton, Dr. Hugh H. Hussey and Dr. Stephen W. Nealon, Jr. Dr. James E. Nolan was elected Associate in the College. Dr. Wallace M. Yater was reelected Governor for the District of Columbia.

Dr. Harry H. Kerr, Washington, is Chairman of a Committee sponsoring plans which are going forward for the Francis R. Hagner Library at the Garfield Memorial Hospital.

Pan-American Medical Association, District of Columbia Chapter, held its last meeting of the season recently at the Army and Navy Club, preceded by a dinner, the President, Dr. James Alexander Lyon, presiding.

Hippocrates-Galen Society has elected Dr. George Huffman, President, and Dr. Walter K. Myers, Secretary-Treasurer, both of Washington.

Washington-Baltimore Psychoanalytic Society, at its last meeting, elected Dr. Ernest E. Hadley, President; Dr. Edith Weigert, Vice-President; and Dr. Ralph Crowley, Secretary-Treasurer.

Dr. Isadore Rodis has been appointed Associate Professor of Psychiatry and Acting Director of the Department of Psychiatry, Georgetown University School of Medicine.

District Tuberculosis Association has elected Dr. J. Winthrop Peabody, President; Dr. H. J. Crosson, Vice-President; and Dr. Edgar W. Davis, a member of the Board of Directors, all of Washington.

Dr. J. Rozier Biggs, Washington, was recently elected President of the Middle Atlantic Medical Directors' Club.

Dr. Stanley D. Willis, having served as Treasurer for the past two years of Emergency Hospital, Washington, has been elected President of the Hospital, and Dr. A. B. Moore reelected Secretary.

Deaths

Dr. William Watson Ayres, Washington, aged 73, died recently of coronary thrombosis and lobar pneumonia.

Dr. Frederick Leslie Benton, Washington, aged 66, died April 8.

Dr. Daniel Davis, Washington, aged 55, died April 17.

Dr. Alice Winans Downey, Washington, aged 78, died recently.

Dr. James Franklin Hilton, Washington, aged 62, died April 12.

Dr. Elizabeth Bailey Muncey, Washington, aged 83, died recently.

Dr. Loy McAfee, Washington, aged 72, died recently of heart disease.

Dr. Marie Meirovna Kovner Ramme, Washington, aged 46, died recently of cerebral hemorrhage.

Dr. Fred Eli Redman, Washington, aged 58, died recently.

Dr. Aurelius Rives Shands, Sr., Washington, aged 81, died April 27.

Dr. Eugene Theodore Stephenson, Washington, aged 69, died April 12.

Dr. Bruce Mayne, Special Expert, Malaria Investigations, U. S. Public Health Service, Washington, aged 58, died April 30.

FLORIDA

Florida Medical Association, at its recent annual meeting, installed Dr. Walter C. Jones, Jr., Miami, President; named Dr. Gilbert S. Osincup, Orlando, President-Elect; and elected Dr. Luther W. Holloway, Jacksonville, Dr. Frederick K. Herpel,

Continued on page 38

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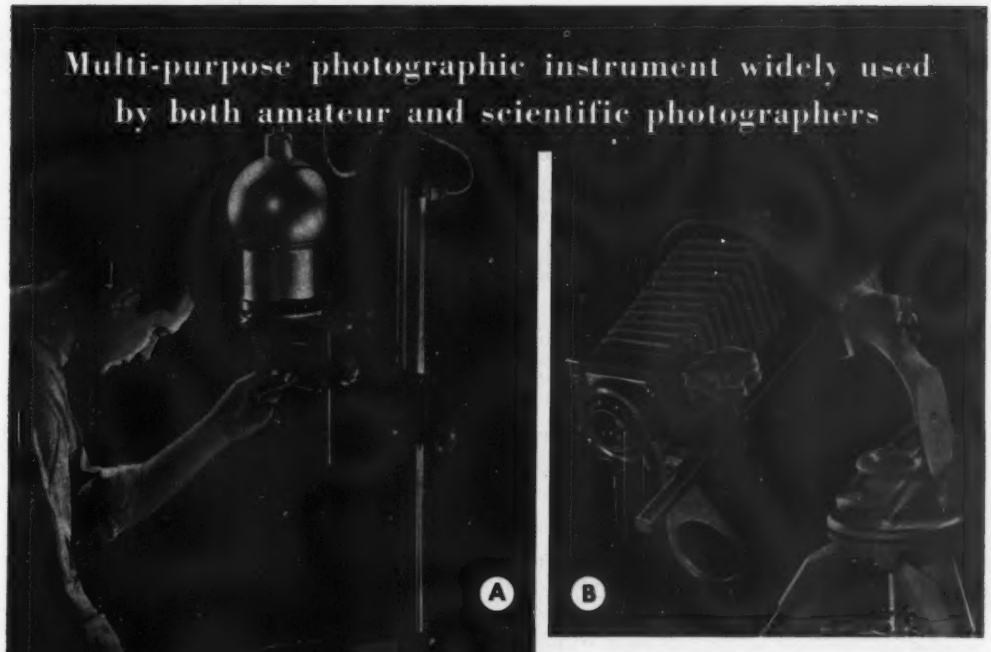

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Continued from page 36

West Palm Beach, Dr. Walter C. Payne, Pensacola, Vice-Presidents; Dr. Shaler A. Richardson, Jacksonville, Secretary-Treasurer; and Dr. Stewart G. Thompson, Jacksonville, Managing Director. The 1942 meeting will be held in West Palm Beach.

Dr. Leland H. Dame, Jasper, has been named Health Officer for Highlands and Glades Counties.

DeSoto-Hardee-Highlands-Charlotte-Glades Counties Medical Society has elected Dr. A. T. Eide, Lake Placid, President; Dr. C. H. Kirkpatrick, Arcadia, Vice-President; and Dr. H. V. Weems, Sebring, Secretary-Treasurer.

Madison-Suwanee County Medical Society has elected Dr. J. M. Price, Live Oak, President; Dr. Eugene D. Thorpe, Madison, Vice-President; and Dr. Irby H. Black, Live Oak, Secretary-Treasurer.

Dr. Clifton Jennings Derrick and Miss Elizabeth Russell McKenzie, both of West Palm Beach, were married recently.

Dr. James L. Borland and Miss Margaret deBelle Gaillard, both of Jacksonville, were married May 1.

Deaths

Dr. Charles A. Barlow, St. Petersburg, aged 66, died April 11 of coronary occlusion.

Dr. George W. Brown, Lawtey, aged 74, died April 2 of coronary occlusion.

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Dr. Franklin Filmore Marsh, Deland, aged 88, died recently of pneumonia following influenza.

Dr. Rufus C. McGahey, Miami, aged 82, died recently of bronchopneumonia.

Dr. Jesse A. Strickland, St. Petersburg, aged 60, died recently of coronary occlusion.

GEORGIA

Dr. C. W. Roberts, Atlanta, was elected to the Board of Trustees of the American Medical Association at the recent annual meeting in Cleveland. Dr. Roberts has represented Georgia in the House of Delegates of the American Medical Association for some twelve years.

Dr. Floyd W. McRae, Atlanta, was recently elected President of the Surgical Association of the Atlanta and West Point R. R., Western Railway of Alabama and the Georgia Railroad.

Dr. C. C. Aven, Atlanta, has been elected President of the Social Planning Council.

Dr. W. H. Wall, Blakely, has been elected President of the Blakely Rotary Club.

The Askew Memorial Hospital, Nashville, was recently dedicated with Dr. Frank Bird, of Valdosta, the principal speaker.

Dr. P. O. Chaudron, Cedartown, has been appointed Associate Medical Examiner for the Polk County Board.

Dr. Howard Phillips and Dr. Linus J. Miller announce their association in the practice of anesthesiology.

Dr. Calvin Sandison, Atlanta, formerly associated with Dr. Lawson Thornton, has opened offices in the Doctors Building for the practice of orthopedic surgery.

Blue Ridge County Medical Society has elected Dr. E. W. Watkins, Ellijay, President; Dr. A. K. Duckett, Blue Ridge, Vice-President; and Dr. C. B. Crawford, Blue Ridge, Secretary-Treasurer.

Clayton-Fayette Counties Medical Society has elected Dr. J. R. Wallis, Lovejoy, President; Dr. Y. R. Coleman, Jonesboro, Vice-President; and Dr. T. J. Busey, Fayetteville, Secretary-Treasurer.

Crisp County Medical Society has elected Dr. Charlie Adams, President; Dr. H. J. Williams, Vice-President; and Dr. L. O. Wootten, Secretary-Treasurer, all of Cordele.

Decatur-Seminole Counties Medical Society has elected Dr. H. B. Jenkins, Donaldsonville, President; Dr. W. L. Wilkinson, Bainbridge, Vice-President; and Dr. M. A. Ehrlich, Bainbridge, Secretary-Treasurer.

Elbert County Medical Society has elected Dr. J. E. Johnson, President; Dr. D. N. Thompson, Vice-President; and Dr. A. S. Johnson, Secretary-Treasurer, all of Elberton.

Forsyth County Medical Society has elected Dr. Marcus Mashburn, President, and Dr. W. E. Lipscomb, Secretary-Treasurer, both of Cumming.

Gordon County Medical Society has elected Dr. M. A. Acree, President; Dr. W. R. Barnett, Vice-President; and Dr. W. D. Hall, Secretary-Treasurer, all of Calhoun.

Habersham County Medical Society has elected Dr. C. M. Sharp, Alto, President; Dr. C. T. Hardman, Tallulah Falls, Vice-President; and Dr. D. H. Garrison, Clarkesville, Secretary-Treasurer.

Hancock County Medical Society has elected Dr. Horace Darden, President, and Dr. H. L. Earl, Secretary-Treasurer, both of Sparta.

Jefferson County Medical Society has elected Dr. S. T. R. Revell, Louisville, President; Dr. Jno. J. Pilcher, Wrens, Vice-President; and Dr. S. C. Ketchin, Louisville, Secretary-Treasurer.

Lamar County Medical Society has elected Dr. J. H. Jackson, President; Dr. D. W. Pritchett, Vice-President; and Dr. S. B. Traylor, Secretary-Treasurer, all of Barnesville.

Laurens County Medical Society has elected Dr. A. T. Coleman, Dublin, President; Dr. C. G. Moye, Brewton, Vice-President; and Dr. O. H. Cheek, Dublin, Secretary-Treasurer.

Montgomery County Medical Society has elected Dr. W. M. Moses, Uvalda, President; Dr. J. E. Hunt, Mt. Vernon, Vice-President; and Dr. J. W. Palmer, Ailey, Secretary-Treasurer.

Sumter County Medical Society has elected Dr. Russell Thomas, Americus, President; Dr. J. C. Logan, Plains, Vice-President; and Dr. R. H. Enzor, Smithville, Secretary-Treasurer.

Walker-Catoosa-Dade Counties Medical Society has elected Dr. R. C. Shepard, LaFayette, President; Dr. F. H. Simonton, Chickamauga, Vice-President; and Dr. P. M. Golley, LaFayette Secretary-Treasurer.

Ware County Medical Society has elected Dr. K. C. Walden, Waycross, President; Dr. Lewis H. Oden, Jr., Blackshear, Vice-President; and Dr. Kenneth McCullough, Waycross, Secretary-Treasurer.

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Continued from page 38

Dr. Wm. C. Cook, Dr. A. N. Dykes, Dr. W. M. Forte and Dr. H. G. West, all of Columbus, have been elected to serve on the City-County Board of Health.

Dr. Edgar H. Greene, Atlanta, has been appointed State Selective Service Medical Officer.

Dr. Wm. G. Tyson, Dr. H. L. Lavington, Dr. G. E. Egloff, Dr. Jno. W. Daniel, Dr. D. W. Fillingim and Dr. Jacob Rubin are serving on Savannah's Selection Boards.

Dr. H. T. Adkins, Americus, Sumter County Commissioner of Health, recently completed a postgraduate course at the University of Georgia School of Medicine.

Dr. Walker L. Curtis, College Park, has been appointed Medical Examiner of the Civil Aeronautics Administration, succeeding the late Dr. David Moncrief.

Dr. S. L. Harp, formerly of Marshallville, is now located at Brunswick, where he is in charge of the Mobile Clinic for Camden, Glynn and McIntosh Counties.

Dr. Jewell G. Gainey, formerly of Blountstown, Florida, has been named Assistant Commissioner of Health of Mucogee County, with offices in Columbus.

Dr. Charles W. Harwell has been named Health Commissioner of Crisp County with offices at Cordele.

Dr. John R. Cain, for the past two years Director of the Division of Industrial Hygiene of the Alabama State Department of Health, Montgomery, has been placed in charge of the Health Unit in Greene County, with headquarters in Greensboro.

Deaths

Dr. Tip Cox Arabi, Nashville, aged 61, died April 4.

Dr. Arlander Alonzo Barge, Newnan, aged 81, died April 18 of heart disease.

Dr. Forrest Mullins Barfield, Atlanta, aged 49, died April 17 of heart disease.

Dr. John Wesley Lee Brannon, Atlanta, aged 67, died recently of multiple sclerosis and myocardial fibrosis.

Dr. George T. Brown, Atlanta, aged 78, died recently of strangulated hernia.

Dr. Marion Lee Compton, Augusta, aged 46, died recently of heart disease.

Dr. Randolph D. Jones, Elza, aged 64, died recently.

Dr. Thomas M. Merritt, Americus, aged 77, died recently of edema of the lungs and fracture of the left hip.

Dr. William F. Sibbett, Douglas, aged 56, died recently.

Dr. Huston B. Terry, aged 65, died recently.

KENTUCKY

Dr. Fred W. Rankin, Lexington, was elected President-Elect of the American Medical Association at the recent annual meeting at Cleveland.

Licking Valley Medical Society has elected Dr. W. R. Houston, Erlanger, President, and Dr. George Herman, Newport, Secretary-Treasurer.

McCracken County Medical Society has elected Dr. J. Ewing Dunn, President; Dr. William Eaton, Vice-President; Dr. E. W. Jackson, Treasurer; and Dr. Leon Higdon, Secretary.

Dr. William E. Gary, Hopkinsville, has been named President of the Kentucky State Medical Association to fill the unexpired term of the late Dr. Austin Bell, Hopkinsville, and will serve until the annual meeting.

The Danville and Boyle Counties Hospital, Danville, has changed its name to the Ephraim McDowell Hospital in honor of the famous Danville surgeon who performed the first ovariotomy.

Dr. John Henry Rompf, Clinical Director of the Eastern State Hospital, Lexington, has been called to military service, and Dr. Anthony E. Coletti, formerly of Norfolk, Nebraska, succeeded him at the hospital.

Dr. Emil A. Steiner, Somerset, has resigned as Health Officer of Pulaski County.

Dr. Lee A. Dare, formerly of Lawrenceburg, has resigned as Health Officer of Anderson County, and Dr. Paul D. Moore, Calhoun, has resigned as Health Officer of McLean County.

Dr. M. J. McNeely, Berry, has moved to Dillsboro, Indiana, where he will be medical supervisor of a sanitarium.

Deaths

Dr. Austin Bell, Hopkinsville, aged 66, died April 3 of coronary disease.

Continued on page 42

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Continued from page 40

Dr. Alice Whittinghill Davis, Owensboro, aged 33, died April 27.

Dr. Richard R. Elmore, Louisville, aged 63, died recently.

Dr. Robert G. Falls, Louisville, aged 78, died May 12.

Dr. George C. Goodman, Paint Lick, aged 75, died May 9.

Dr. Charles W. Holland, Scottsville, aged 68, died April 24 of coronary occlusion.

Dr. Harry E. Mechling, Louisville, aged 71, died recently.

Dr. Claude Thomas Wolfe, Louisville, aged 57, died April 9.

LOUISIANA

Louisiana State Coroners' Association has elected Dr. J. B. Hall, Bossier, President; Dr. L. L. Ricks, Independence, Secretary-Treasurer, reelected; Dr. C. J. Barker, Thibodaux, First Vice-President; and Dr. R. F. DeRouen, New Iberia, Second Vice-President.

Louisiana State Pediatric Society has elected Dr. Julian Graubarth, New Orleans, President; Dr. W. B. Worley, Shreveport, Vice-President; and Dr. W. C. Rivenbark, New Orleans, Secretary-Treasurer.

Louisiana Association of Pathologists, at its first annual meeting, elected Dr. William R. Mathews, Shreveport, President; Dr. Andrew V. Friedrichs, New Orleans, Vice-President; and Dr. Albert E. Casey, New Orleans, Secretary. Dr. Edwin H. Lawson, New Orleans, and Dr. Bela Halpert, New Orleans, became members of the Council.

Dr. Theodore Watters, Assistant Professor of Psychiatry and Neurology at Tulane University Medical School, New Orleans, has been elected to Fellowship in the American Psychiatric Association.

Dr. Henry W. E. Walther, New Orleans, was recently elected President of the Louisiana Urological Society.

Dr. W. H. Perkins, Professor of Preventive Medicine at Tulane University School of Medicine, has been selected President of the New Orleans Council of Social Agencies.

New Orleans Pure Milk Society reelected all officers at its recent annual meeting as follows: Dr. Roy E. de la Houssaye, President; Dr. Edwin A. Socola, Vice-President; and Dr. W. C. Rivenbark, Assistant Secretary.

DEATHS

Dr. Jefferson Davis Bloom, New Orleans, aged 79, died recently of aspiration pneumonitis and chronic myocarditis.

Dr. Carr Thomas Dowell, Jr., Baton Rouge, aged 35, died recently of acute dilatation of the heart.

Dr. D. J. Dunckelman, Clarence, aged 58, died recently of hypertension.

Dr. George Washington Mixon, Watson, aged 77, died recently of gastric carcinoma.

Dr. Thomas C. Moody, Lake Charles, aged 70, died recently of angina pectoris.

Dr. Shea Edward Prince, Shreveport, aged 71, died February 6.

Dr. Samuel Henry Scruggs, Cloutierville, aged 78, died recently of coronary occlusion.

MARYLAND

Dr. Harvey B. Stone, Baltimore, was elected President of the American Surgical Association at its recent annual meeting.

Maryland Academy of Medical and Surgical Sciences devoted its recent meeting in Baltimore to honoring Dr. Arthur G. Barrett, the Society's President for the past twenty-two years, and presented him with a silver coffee service. He was reelected President at the recent meeting.

DEATHS

Dr. John Horatio Dorsey, Grantsville, aged 89, died April 10 of chronic myocarditis.

Dr. Allen Kramer Krause, Baltimore, aged 60, died May 12.

Dr. Harry Nalley, Mount Rainier, aged 64, died recently.

Dr. Edgar Ardis Peterson, Baltimore, aged 59, died recently of burns received when his home caught fire.

MISSISSIPPI

Mississippi State Medical Association, at its recent annual meeting at Biloxi, installed Dr. Augustus Street, Vicksburg,

Continued on page 44

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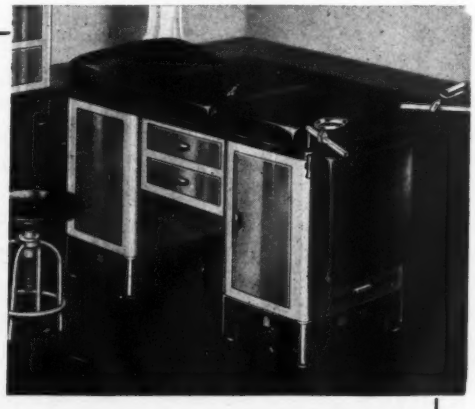

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* Sharpe, J. C.: *Nebraska State Med. Jl.* 25:413, Nov., 1940.

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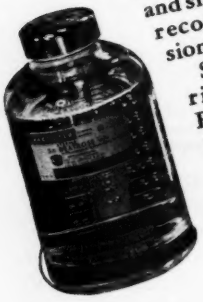

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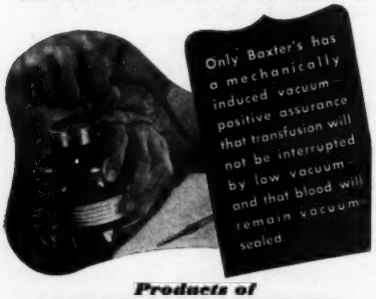
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Continued from page 42

President; and elected Dr. H. Lowry Rush, Meridian, President-Elect; Dr. B. B. O'Mara, Biloxi, Dr. H. C. Sheffield, Biloxi, and Dr. T. H. Rayburn, Pontotoc, Vice-Presidents; and Dr. T. M. Dye, Clarksdale, Secretary, reelected.

Dr. William H. Frizell and Miss Margaret Alexander, both of Brookhaven, were married recently.

Dr. Alston Callahan, Vicksburg, and Miss Eivor Holst, San Francisco, California, were married recently.

DEATHS

Dr. C. L. Green, Utica, aged 63, died May 15.
Dr. S. B. Henton, Decatur, aged 79, died recently.
Dr. L. E. Stennis, McComb, aged 75, died May 9.
Dr. R. N. S. Young, Brooklyn, aged 61, died May 5.

MISSOURI

Cooper County Medical Society has elected Dr. T. C. Beckett, President; Dr. W. H. Ziegler, Vice-President; and Dr. J. C. Tincher, all of Boonville, Secretary.

Kansas City Surgical Society, at its recent annual dinner, installed Dr. James E. Stowers, President; and elected Dr. B. L. Myers, Vice-President, and Dr. Harry C. Lapp, Secretary-Treasurer.

St. Francois-Iron-Madison-Washington-Reynolds Counties Medical Society has elected Dr. Van W. Taylor, Bonne Terre, President; Dr. J. L. Thurman, Potosi, Vice-President; and Dr. C. C. Ault, Farmington, Secretary-Treasurer.

Missouri Chapter of the American College of Chest Physicians was organized in St. Louis recently and will meet annually at the time of the Missouri State Medical Association meeting. Dr. Herbert L. Mantz, Kansas City, was elected President; Dr. E. E. Glenn, Springfield, Vice-President; and Dr. Paul Murphy, Koch, Secretary.

Dr. M. F. Arbuckle, St. Louis, has been called for one year's active duty in the Army. Dr. A. C. Stutsman, his Associate, will take care of his practice during his absence.

Dr. Ralph E. Duncan, Kansas City, was recently reelected Secretary-Treasurer of the Missouri-Kansas Neuropsychiatric Society.

DEATHS

Dr. Isaac N. Barnett, Kansas City, aged 68, died April 4 of cerebral hemorrhage.

Dr. Arthur Jesse Edgar Decker, Illmo, aged 63, died recently of heart disease and chronic nephritis.

Dr. Philip Jameson Heuer, St. Louis, aged 69, died recently of carcinoma of the stomach and gastric hemorrhage.

Dr. George Arthur Huntley, Branson, aged 75, died recently of myocarditis and influenza.

Dr. Arthur Lewis Sneed, Kansas City, aged 68, died recently of cardiac decompensation.

Dr. William S. Windsor, Climax Springs, aged 79, died recently.

NORTH CAROLINA

Burke County Medical Society has elected Dr. C. L. Walton, Glen Alpine, President; Dr. John S. McKee, Morganton, Vice-President; and Dr. Edith Goodwin-Barbour, Morganton, Secretary-Treasurer.

North Carolina Neuropsychiatric Association, at its recent meeting, elected Dr. Archibald A. Berron, Charlotte, President; Dr. Fonso B. Watkins, Morganton, Vice-President; and Dr. Robert Burke Suitt, Durham, Secretary.

Dr. Raymond S. Crispell, Duke Hospital, Durham, has been ordered to active duty in the U. S. Navy at the Naval Air Training Station, Pensacola, Florida, having obtained a year's leave of absence from the Duke University. As a Lieutenant-Commander in the Medical Corps, he will teach neuropsychiatry and act as neuropsychiatrist to the Naval Dispensary and Hospital at Pensacola.

Dr. William deB. MacNider, Chapel Hill, has been awarded the Kober Medal for his researches in Bright's disease and in tissue resistance, the presentation of the medal being made at the recent meeting of the Association of American Physicians at Atlantic City. The medal was established by the late Dr. Kober, an eminent physician long associated with George Washington University, by a bequest to the American College of Physicians to be awarded from time to time for an important achievement in medical research.

Continued on page 46

NO food (except breast milk) is more highly regarded than Similac for feeding the very young, small twins, premature, or infants who have suffered a digestive upset. Similac is satisfactory in these special cases simply because it *resembles breast milk so closely*, and normal babies thrive on it for the same reason. This similarity to breast milk is definitely desirable—*from birth until weaning*.

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Continued from page 44

Dr. Charles W. Armstrong, Salisbury, was elected President of the North Carolina Tuberculosis Association at its recent annual meeting.

Dr. George W. Morse, a member of the Davis Hospital Staff, Statesville, for more than a year, is engaged in private practice at Pensacola, Florida.

Dr. Dudley W. Smith, Waynesville, has gone to England to serve with the American Hospital near London for six months.

Dr. Will H. Lassiter, Jr., Selma, has been appointed Health Officer of Johnston County, succeeding Dr. James H. Bunn, Jr., Smithfield, who resigned to enter military service.

Dr. Paul R. Macfadyen, Jr., Concord, recently acting Health Officer of Cabarrus County, has been appointed in Richmond County to succeed Dr. Tidal Boyce Henry, Rockingham.

Dr. Nancy Bowman Wise and Mr. William Sterry Branning, both of Durham, were married recently.

Dr. Berlin Francis Barham and Miss Nancy E. McNeely, both of Winston-Salem, were married recently.

Dr. John Francis Register and Miss Margaret Lucette Brewer, both of Greensboro, were married recently.

Dr. Leon Toland Kennedy, Winston-Salem, and Miss Irene Storm, Mooresville, were married recently.

Dr. Alexander A. York, High Point, and Mrs. Mary E. Inman, Washington, D. C., were married recently.

Dr. William J. Lancaster, Wilmington, and Miss Jean Lunden, Tampa, Florida, were married recently.

Dr. Erastus Genair Goodman, Leland, and Miss Elizabeth Zuidema, Hampton, Virginia, were married recently.

Dr. William L. Kirkpatrick and Miss Ellie Thompson, both of Waynesville, were married recently.

Dr. Alfred Franklin Hammond, Jr., Polloksville, and Miss Lucy Olivia Barrow, Grifton, were married recently.

Deaths

Dr. George L. Wimberley, Jr., Rocky Mount, aged 79, died recently of cerebral hemorrhage.

Dr. Denis Roscoe Wolff, Greensboro, aged 44, died recently of regional ileitis.

OKLAHOMA

Dr. Henry H. Turner, Oklahoma City, was elected Secretary-Treasurer of the Association for the Study of Internal Secretions at its meeting in Atlantic City, New Jersey, in May.

Dr. Philip Webster Horn, Ardmore, and Miss Ruth Elizabeth Johnson, New Orleans, Louisiana, were married recently.

Deaths

Dr. Nellie May Johnson, Tulsa, aged 63, died recently.

Dr. James Weedin Martin, Drumright, aged 86, died recently of chronic nephritis and myocarditis.

Dr. George W. Sisler, Tulsa, aged 77, died recently of coronary thrombosis.

SOUTH CAROLINA

South Carolina Medical Association, at its recent annual meeting, elected Dr. Julian Price, Florence, Secretary and Editor to succeed the late Dr. E. A. Hines, Seneca. Offices of the Association are being moved to Florence from Seneca.

Dr. Will S. Judy, Greenville, is one of the three physicians in South Carolina who has a private pilot's license.

South Carolina Pediatric Association has elected Dr. I. H. Grimball, President, and Dr. Lonita Boggs, Vice-President, both of Greenville.

Dr. Robert A. Brown, Jr., Greenville, has been transferred to Walter Reed General Hospital, Washington, D. C., in the Department of Ophthalmology.

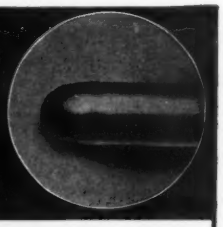
Dr. Chas. N. Wyatt, Greenville, has been called to active military service and is stationed at Camp Forrest, Tennessee.

TENNESSEE

Dr. Harrison H. Shoulders, Nashville, was reelected Speaker of the House of Delegates of the American Medical Association at its recent annual meeting in Cleveland, Ohio.

Continued on page 48

RADON SEEDS



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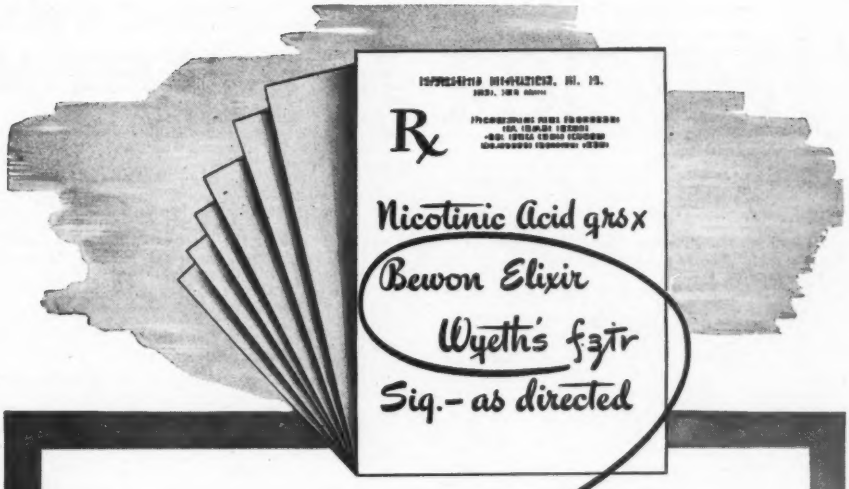

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Continued from page 46

Dr. Ernest W. Goodpasture, Vanderbilt University, Nashville, has recently had conferred upon him the degree of Doctor of Science by the University of Chicago.

Dr. Robert Leon Bourland, Memphis, and Miss Rosa Elizabeth Landess, Murray, Kentucky, were married recently.

Dr. David R. Weill, Jr., Chattanooga, and Miss Ava Ada Winkler, were married recently.

Deaths

Dr. S. W. Alexander, McKenzie, aged 37, died April 9.

Dr. H. A. Gant, Columbia, aged 89, died May 5.

Dr. William N. Gray, Celina, aged 81, died recently of cerebral hemorrhage.

Dr. Robert Bernard Gaston, Lebanon, aged 53, died April 16.

Dr. William Burchett Page, Granville, aged 90, died recently of cerebral hemorrhage.

Dr. Franklin May Sanders, Adamsville, aged 53, died recently.

Dr. Reuben R. Roach, New Market, aged 65, died recently of cerebral hemorrhage.

Dr. Raymond Wallace, Chattanooga, aged 65, died May 1.

TEXAS

State Medical Association of Texas, at the recent annual meeting in Fort Worth, installed Dr. N. D. Buie, Marlin, President; and elected Dr. Judson L. Taylor, Houston, President-Elect; Dr. C. O. Terrell, Fort Worth, Dr. Mitchell O. Gibson, Lufkin, and Dr. R. B. Touchstone, Lytle, Vice-Presidents; Dr. K. H. Beall, Fort Worth, Treasurer; and Dr. Holman Taylor, Secretary, reelected. The 1942 meeting will be held at Corpus Christi.

Texas Railway and Traumatic Surgical Association has elected Dr. P. R. Denman, Houston, President; Dr. Homer Allen, Brownwood, First Vice-President; Dr. W. B. Reeves, Greenville, Second Vice-President; and Dr. Ross Trigg, Fort Worth, Secretary-Treasurer.

Texas Dermatological Society has elected Dr. James Greenwood, Jr., Houston, President; Dr. Giles W. Day, Fort Worth, First Vice-President; Dr. J. A. McIntosh, San Antonio, Second Vice-President; and Dr. Fred Rogers, Dallas, Secretary-Treasurer.

Texas Chapter of the American College of Chest Physicians has been organized and following officers elected: Dr. Charles M. Hendricks, El Paso, President; Dr. J. B. McKnight, Sanatorium, Vice-President; and Dr. C. J. Koerth, San Antonio, Secretary.

Texas Society of Gastroenterologists and Proctologists has elected Dr. H. T. Hayes, Houston, President; Dr. Hugh Beaton, Fort Worth, First Vice-President; Dr. D. L. Curb, Galveston, Second Vice-President; and Dr. Tom E. Smith, Dallas, Secretary-Treasurer, reelected.

Texas State Heart Association has elected Dr. Charles T. Stone, Galveston, President; Dr. W. B. Adamson, Abilene, Vice-President; and Dr. Victor E. Schulze, San Angelo, Secretary, reelected.

Texas Orthopedic Association has elected Dr. E. M. Cowart, Houston, President; Dr. Fred Bloom, Houston, Vice-President; and Dr. Ruth Jackson, Dallas, Secretary-Treasurer.

Texas Pediatric Society has elected Dr. P. E. Luecke, Dallas, President; Dr. Frank H. Lancaster, Houston, President-Elect; and Dr. John Ashby, Dallas, Secretary-Treasurer.

Texas Allergy Association has elected Dr. Homer E. Prince, Houston, President, and Dr. Sim Hulsey, Fort Worth, Secretary-Treasurer.

Baylor University Alumni Association has elected Dr. Ben Rubenstein, Dallas, President; Dr. Edward T. Smith, Houston, Vice-President; and Dr. Tom E. Smith, Dallas, Secretary-Treasurer.

South Texas District Medical Society has elected Dr. W. R. Cooke, Galveston, President; Dr. J. T. Tadlock, Dayton, Vice-President; and Dr. Abbe A. Ledbetter, Houston, Secretary-Treasurer, reelected.

Mrs. Frank N. Haggard, San Antonio, wife of Dr. Frank N. Haggard, was elected President-Elect of the Woman's Auxiliary to the American Medical Association at the recent annual meeting in Cleveland. Mrs. Haggard is a Past President of the Woman's Auxiliary to the Southern Medical Association.

Dr. John Elbert Dunlap and Miss Marianne Touchstone, both of Dallas, were married May 23.

Deaths

Dr. Joseph F. Beadley, Shannon, aged 69, died recently.

Dr. Benjamin Hardy Carlton, Freeport, aged 79, died recently of influenza.

Dr. Edward E. Thomas, Coolidge, aged 70, died recently of injuries received in an automobile accident.

Dr. Thomas Wilson Crowder, Sherman, aged 68, died April 6 of gastric hemorrhage and heart disease.

Dr. Ernest Robertson, Beaumont, aged 41, died recently of cerebral hemorrhage.

Dr. John Tucker Halsell, Laredo, aged 66, died recently.

Dr. Thomas Molloy Harris, Pilot Point, aged 63, died recently of cerebral hemorrhage.

Dr. William M. Houghton, Floydada, aged 73, died recently.

Dr. John Ransom Kight, Ennis, aged 64, died recently.

Dr. Austin E. Miller, McAllen, aged 75, died recently of ruptured aneurysm of abdominal aorta.

Dr. Julian N. Mincey, Mineral Wells, aged 72, died recently of cerebral embolism.

Dr. Walter Noble, Aransas Pass, aged 64, died recently.

Dr. James Walter Park, Kaufman, aged 85, died recently of coronary thrombosis.

Dr. William J. L. Roberts, Chapel Hill, aged 63, died recently of heart disease.

VIRGINIA

Medical Society of Virginia will hold its next annual meeting at Virginia Beach, October 6-8.

Amelia County Medical Society has elected Dr. G. Craig Eggleston, Amelia, President; Dr. W. L. Davenport, Amelia, Vice-President; and Dr. James L. Hamner, Mannboro, Secretary-Treasurer, reelected.

Roanoke Academy of Medicine has elected Dr. M. H. Williams, President; Dr. D. B. Stuart and Dr. A. M. Groseclose, Vice-Presidents; and Dr. H. B. Stone, Jr., Secretary-Treasurer, all of Roanoke.

Virginia Society of Ophthalmology and Otolaryngology has

Continued on page 50

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RICHMOND VIRGINIA

Continued from page 48

elected Dr. Mortimer H. Williams, Roanoke, President; Dr. Guy Fisher, Staunton, President-Elect; and Dr. Meade Edmunds, Petersburg, Secretary-Treasurer. The next meeting will be held in Staunton.

American Psychiatric Association, at its recent annual meeting in Richmond, installed Dr. James K. Hall, Richmond, President; named Dr. Arthur Ruggles, Providence, Rhode Island, President-Elect; and elected Dr. Winfred Overholser, Washington, D. C., Secretary-Treasurer.

The Society of Neurological Surgeons met in Richmond in May and in the absence of the President, Dr. Howard W. Fleming, of San Francisco, Dr. C. C. Coleman, Richmond, acted as host and presided over the scientific sessions.

Dr. C. C. Coleman, Richmond, Professor of Neurological Surgery at the Medical College of Virginia since 1924 and Clinical Professor of Neurological Surgery at the University of Virginia since 1937, has been appointed by the Governor to the Board of Visitors of the College of William and Mary for the unexpired term of Mr. Edward R. Stettinius, Jr., who resigned to give his services to the national defense program. Dr. Coleman is an alumnus of William and Mary and now is President of the Richmond Alumni Club of the College.

A bronze tablet commemorating the service of Base Hospital No. 45, known as the McGuire Unit in France during World War I, was recently presented to the Medical College of Virginia by the Base Hospital No. 45, Veterans' Association. Dr. Stuart McGuire, Richmond, Commander of the Unit, being ill, the presentation on behalf of the President of the College was made by Dr. William Lowndes Peple, Richmond. The tablet was unveiled by a great nephew of Dr. McGuire.

At the recent meeting of the Southern Society of Clinical Surgeons action was taken to establish a memorial to the late Dr. John S. Horsley, Jr., Richmond, a charter member of the Society, who was killed in an automobile accident last November, the first member to die in the organization's fifteen years' existence. A bronze tablet will be erected in St. Elizabeth's Hospital, Richmond.

At the last annual session of the American College of Physicians the following physicians were inducted to Fellowship: Dr. Staige Davis Blackford, Charlottesville; Dr. Kenneth Dawson Graves, Roanoke; Dr. Edward Bruce Mewborne, Newport News; Dr. Collins Denny Nofsinger, Roanoke; and Dr. Oscar Swineford, Jr., Charlottesville. Dr. Julian Ruffin Beckwith, Charlottesville, and Dr. Lewis T. Stoneburner, III, Richmond, were elected to associateship.

Dr. C. M. Caravati, Richmond, after studying in the Department of Gastroenterology and Nutrition at Johns Hopkins Hospital, will return to Richmond to practice, limiting his work to that specialty.

Dr. Leslie M. Bell is associated with Dr. James A. Miller, Winchester, limiting his practice to surgery and gynecology.

Dr. Algerd Powell, formerly of Roanoke, has located in Buena Vista in the offices of the late Dr. F. L. Thurman.

Dr. Louis Fry Galvin has returned to Richmond after doing special work in pediatrics at the Cornell Medical Center, New York.

Dr. Mowey Presberg, formerly with the Veterans' Hospital, Roanoke, is now connected with the Veterans' Administration Facility at Lyons, New Jersey.

Dr. Eugene Bowie Shepherd and Miss Mary Walker Lewis, both of Richmond, were married recently.

Dr. Charles Lemuem Prince, III, Charlottesville, and Miss Katherine Wachob Eaton, Pittsburg, Pennsylvania, were married recently.

Dr. William Fitzgerald Cavedo and Miss Edith Earline Mann, both of Richmond, were married recently.

Dr. Howard McDowell McCue and Miss Carolyn Moore, Richmond, were married April 5.

Dr. Charles Russell Robins, Jr., and Miss Susan Clay, both of Richmond, were married April 19.

Deaths

Dr. Llewellyn Powell, Alexandria, aged 62, died recently.

Dr. Charles K. Kernan, Marion, aged 73, died April 18.

Dr. Wm. T. Oppenhimer, Sr., Richmond, aged 80, died June 12.

Dr. Wm. T. Oppenhimer, Jr., Richmond, aged 49, died April 2.

Dr. James Taylor Walker, Richmond, aged 81, died recently.

Dr. Edward Barton Jones, McLean, aged 74, died April 6 of Parkinson's disease.

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WEST VIRGINIA

At the seventy-fourth annual meeting of the West Virginia State Medical Association held in May Dr. R. O. Rogers, Bluefield, was elected President; Dr. Guy H. Michael, Belington, First Vice-President; Dr. E. H. Starcher, Earling, Second Vice-President; and Dr. T. M. Barber, Charleston, Treasurer. Dr. Rogers will take office on January 1, 1942. White Sulphur Springs was selected for the 1942 meeting place.

Deaths

Dr. John Owen McQueen, Summersville, aged 68, died recently of pneumonia.

Dr. John M. Fadeley, Point Pleasant, aged 63, died April 10 of coronary thrombosis.

Dr. William H. Hannum, Paw Paw, aged 67, died recently.

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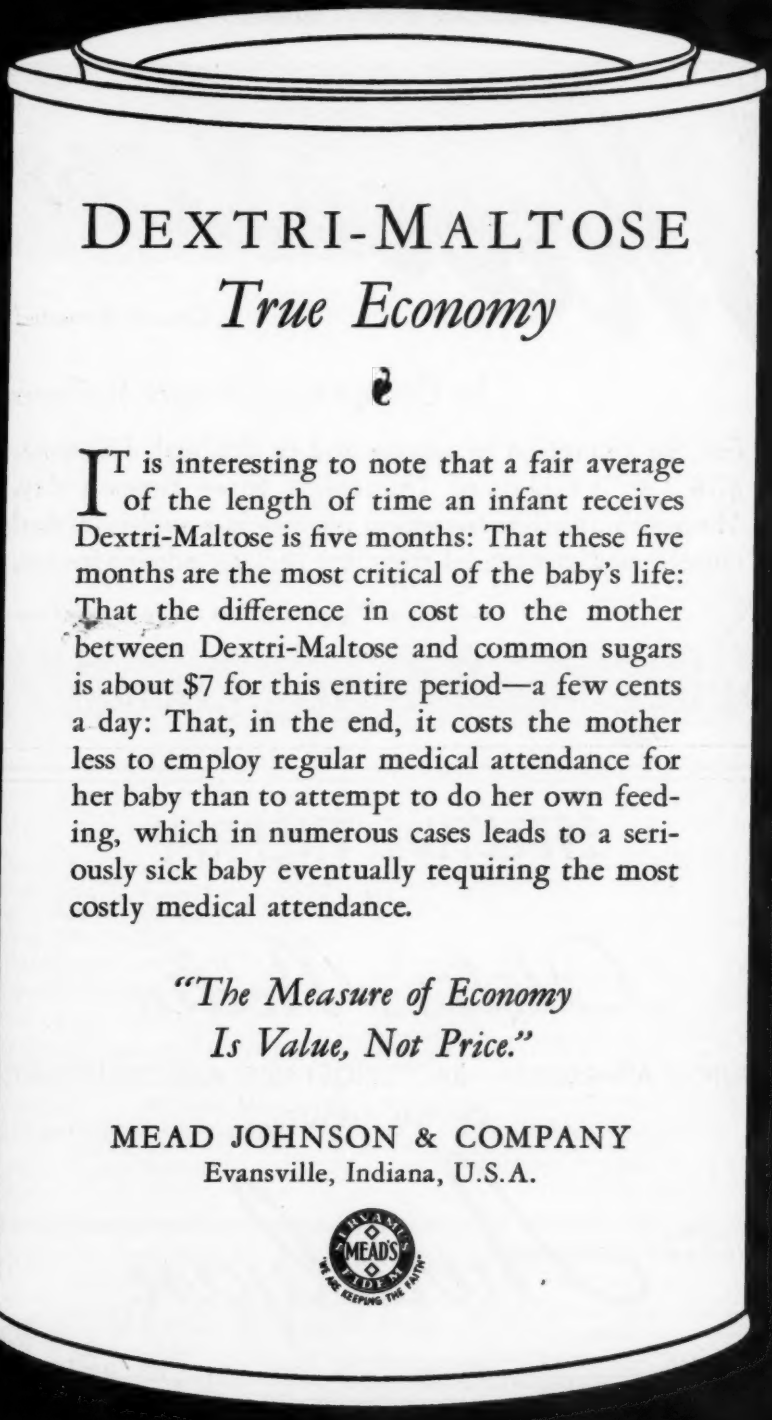


DEXTRI-MALTOSE

True Economy

IT is interesting to note that a fair average of the length of time an infant receives Dextri-Maltose is five months: That these five months are the most critical of the baby's life: That the difference in cost to the mother between Dextri-Maltose and common sugars is about $7 for this entire period—a few cents a day: That, in the end, it costs the mother less to employ regular medical attendance for her baby than to attempt to do her own feeding, which in numerous cases leads to a seriously sick baby eventually requiring the most costly medical attendance.

"The Measure of Economy
Is Value, Not Price."

MEAD JOHNSON & COMPANY
Evansville, Indiana, U.S.A.

MEAD'S
"WE ARE KEEPING THE FAITH"

Are the Neuritic Symptoms of Pregnancy *due to a deficiency of vitamin B_1 (thiamine)?*

SUCH common neuritic symptoms of pregnancy as pains in arms and legs, muscle weakness, and (less frequent but more serious) paralysis of the extremities may result from a shortage of antineuritic vitamins, recent investigations appear to show. Although neuronitis of pregnancy has long been considered a toxemia, no toxins have ever been identified.

Clinical observations of Strauss and McDonald lead to the conclusion that the condition is a dietary deficiency disorder similar to beriberi, caused by lack of vitamin B_1. They report recovery in their cases receiving this therapy, including dried brewers' yeast.

Hyperemesis as Cause of Avitaminosis

Wechsler observes that all cases of polyneuritis of pregnancy recorded in the literature were preceded by long periods of severe vomiting. "It would seem," he adds, "that because of actual starvation these patients suffered from avitaminosis and consequent neuritis," a view likewise held by Hirst, Luikart, and Gustafson. Plass and Mengert observe that the practice of giving high carbohydrate feedings for hyperemesis gravidarum is still more likely to cause avitaminosis.

Dried brewers' yeast, as it is far richer than any other food in vitamin B_1 (thiamine), is being used with benefit both in the prevention and treatment of polyneuritic symptoms of pregnancy. Lewy found that additions of yeast to the diet reduced electric irritability of the peripheral nerves and brought clinical improvement. Vorhaus states that he and his associates, after administering large amounts of vitamin B_1 (thiamine) to 250 patients having various types of neuritis, including that of pregnancy, observed in about 90% of cases "varying degrees of improvement, i.e., from partial relief of pain to complete disappearance of all symptoms."

Need for Vitamin B_1 (thiamine) in Lactation

Evans and Burr, Hartwell, Sure and co-workers, and Macy *et al* are among numerous authorities who find that the nursing mother also needs a supplement of vitamin B_1 (thiamine) from 3 to 5 times the normal requirement. It is accepted that during pregnancy and lactation the requirement for vitamin G (riboflavin) is increased.

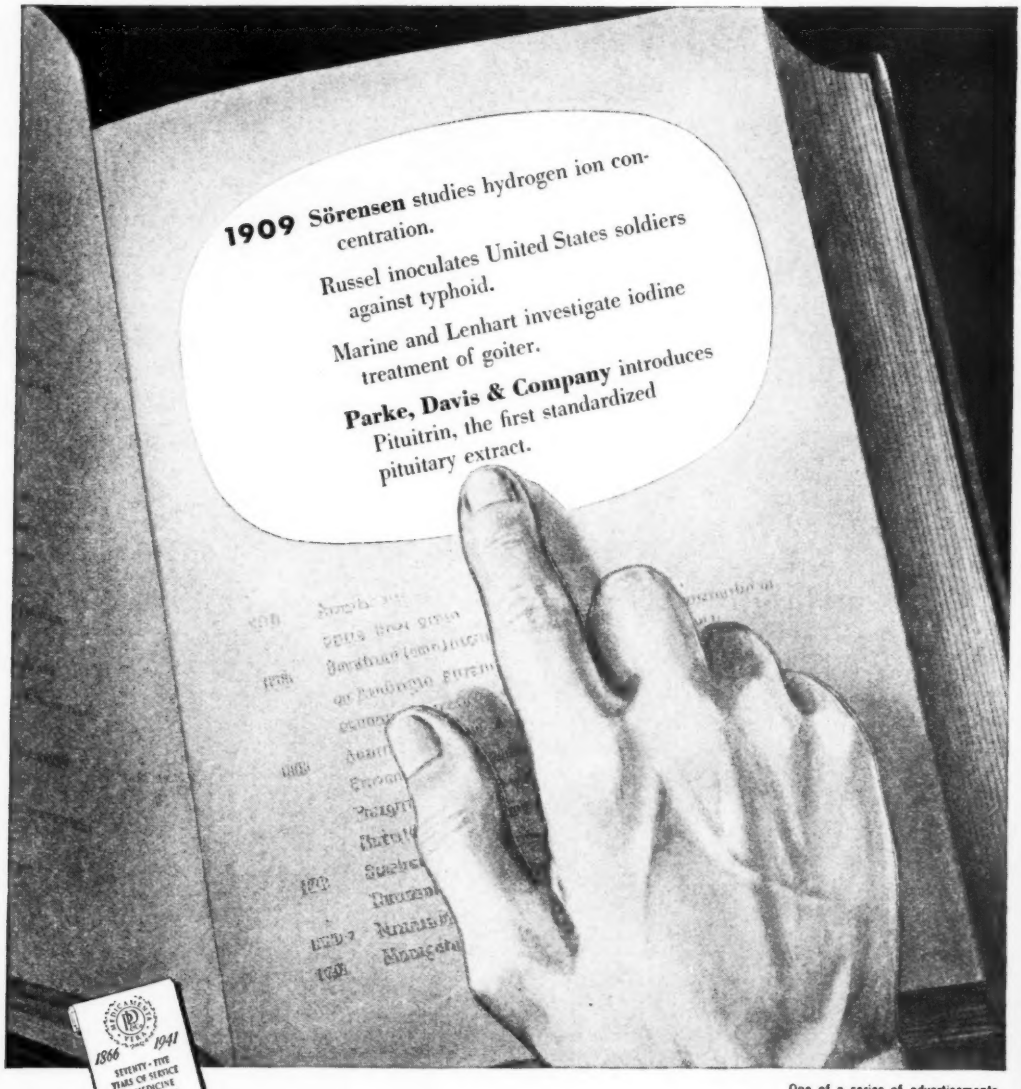
Consisting of nonviable yeast, Mead's Brewers Yeast Tablets offer not less than 50 International vitamin B_1 (thiamine) units and 50 Sherman vitamin G (riboflavin) units per gram (20 International units of vitamin B_1 and 20 Sherman units of vitamin G per tablet).

Supplied in bottles of 250 and 1,000 tablets, also in 6-oz. bottles of powder.

Please enclose professional card when requesting samples of Mead Johnson products to co-operate in preventing their reaching unauthorized persons

Mead Johnson & Company, Evansville, Indiana, U. S. A.

THESE NAMES, THESE YEARS . . .
HAVE HELPED MAKE MODERN MEDICAL HISTORY


1909 **Sörensen** studies hydrogen ion concentration.
Russel inoculates United States soldiers against typhoid.
Marine and Lenhart investigate iodine treatment of goiter.
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